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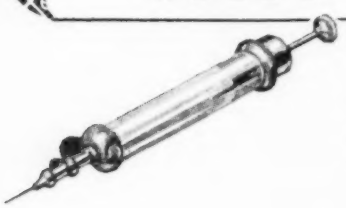

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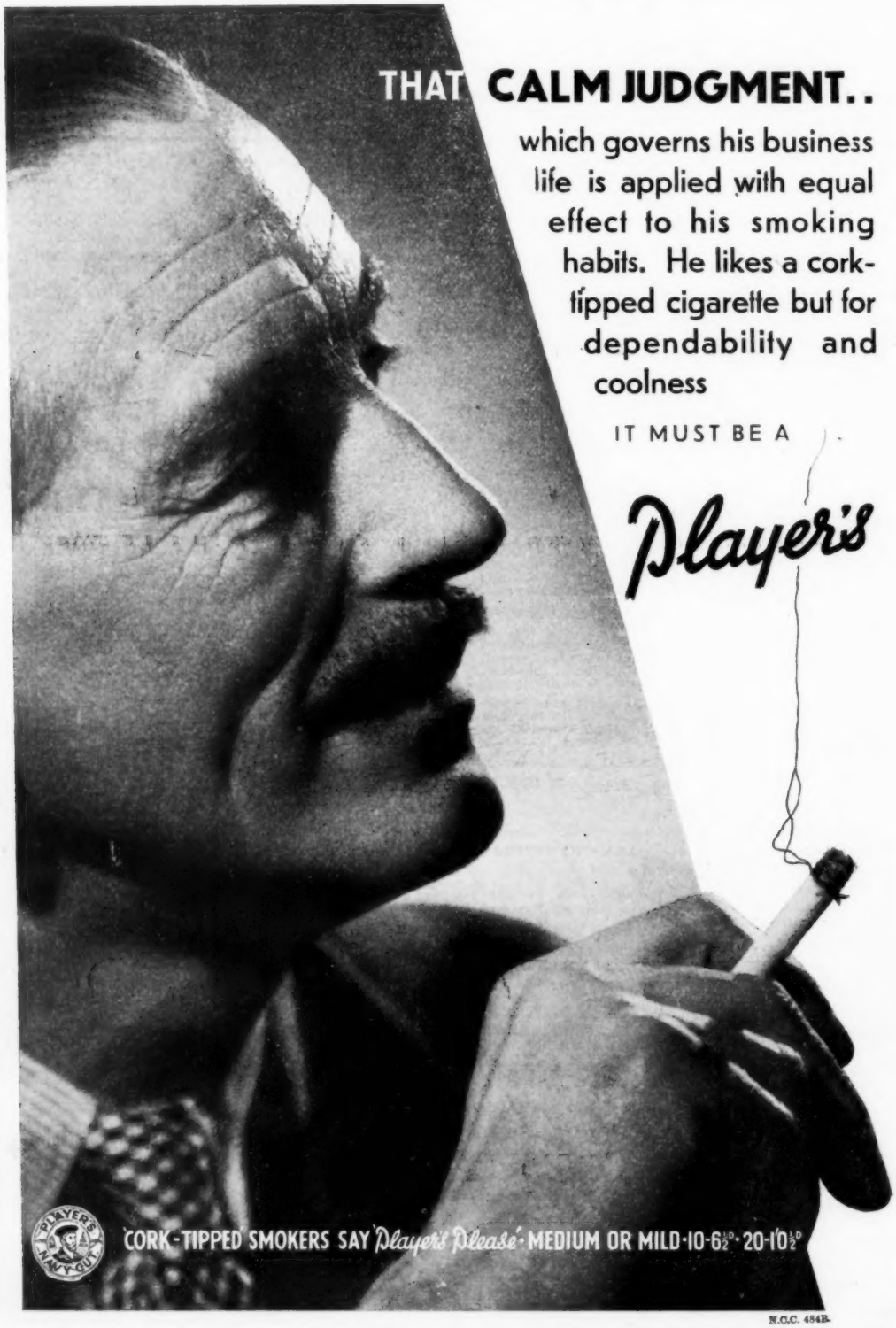
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ADDRESSES AND ORIGINAL ARTICLES

ACUTE RHEUMATIC CARDITIS *

BY W. T. RITCHIE, O.B.E., M.D. Edin., F.R.C.P.E.

PROFESSOR EMERITUS OF MEDICINE AND OF CLINICAL MEDICINE IN THE UNIVERSITY OF EDINBURGH

THE most frequent, and from the economic and social aspects the most important, form of myocarditis is unquestionably that due to rheumatism. Other infective diseases have been eradicated from our land or are being brought under control, but rheumatic fever is still a prevalent scourge, rivalling if not surpassing tuberculosis as a cause of sickness and death. A recent inquiry revealed that 1 in 8 of all medical inpatients in the principal hospitals of Edinburgh was affected with rheumatic heart-disease, and that 52·8 per cent. of all cases of heart-disease in our Royal Infirmary were of rheumatic origin.

The number of problems concerning rheumatism that still await solution is untold. Its causation has not yet been determined; its relation to environmental factors, its infectivity and allergic nature are still uncertain (Hench et al. 1938). We do not know why one child and not another, whether poor or rich, town-dweller or country-bred, falls a victim to rheumatic fever and is in imminent danger of becoming a cardiac cripple. We have but a fragmentary knowledge of the end-results of rheumatic heart-disease when the circulation is failing. On these matters I shall not dwell; but, although I may be thought "to carrie owles to Athens," I shall present some observations on acute rheumatic carditis.

During a period of sixteen and a half years ending last autumn there were 268 cases of rheumatic fever, 127 males and 141 females, under my care in hospital. Of these 43 per cent. (51 males, 66 females) were between the ages of eleven and twenty; 65 per cent. (75 males, 98 females) were between eleven and thirty. The oldest was a woman aged sixty-four, the youngest a girl aged six.

Incidence

Of the 179 patients † observed in 1922–34 52 per cent. were admitted during a first attack of rheumatic fever; 48 per cent. during an exacerbation or recurrence; 6 per cent. had previously suffered from chorea; and 47 per cent. gave a history of existing or recently antecedent infection of the upper respiratory tract—e.g., tonsillitis, pharyngitis, bronchitis, and sinusitis—or of aural sepsis. In 2 cases acute appendicitis played the initiatory part usually taken by septic tonsils in the tragedy of rheumatic carditis. Of these 179 cases there was acute polyarthritis in 157 (87 per cent.) and carditis in 95 (53 per cent.). In 47·1 per cent. of the carditis cases the damage to the heart began during a first attack of rheumatic fever, in 43·4 per cent. during a second attack, and in 3·8 per cent. during a third attack. Thus, in 90·5 per cent. of the carditis cases the heart became damaged during either a first or a second attack of rheumatic fever; and most of those thus affected were between the ages of eleven and twenty. The risk of carditis lessens as the individual grows older. Endocarditis, recorded in 89 cases (49·6 per cent.), was considered to be "primary," not an exacerbation or recurrence, in 41 (22·9 per cent.). Clinically this affected the mitral valve alone in 82·6 per cent., the mitral and aortic valves in 16·5 per cent., and the aortic valve alone in 0·9 per cent. Pericarditis was observed in 35 cases (19·5 per cent.), of which 30 presented evidence of endocarditis also.

Diagnosis

Rheumatic carditis is in many respects analogous to tuberculosis. The disease may be as quickly fatal as is miliary tuberculosis, or it may be a chronic process in which inflammatory fibrous tissue impairs the mechanical efficiency of the affected organ. The recognition of the beginning of both diseases is beset with difficulties. That of carditis is often a mere supposition, because it usually begins insidiously during an attack of apparently uncomplicated rheumatic fever and develops gradually into a subacute or chronic process. Many months, even years, often elapse before the carditis is first recognised in the form of mitral stenosis or chronic myocardial failure.

While the carditis is still in an early phase of development, cardiac enlargement can seldom be detected even by radiography; but the myocardial damage can sometimes be revealed by electrocardiographic abnormalities (Shookhoff and Taran 1931) similar to those arising during the course of other infective diseases, notably diphtheria and Chagas's disease (Chagas and Villela 1922, Chagas 1935). In a personal study of 100 cases of rheumatic fever 20 yielded normal electrocardiograms, auriculoventricular conduction time was longer than 0·19 sec. in 37, and branch block or partial auriculoventricular block was found in 11. These changes usually disappear during convalescence (Parkinson, Gosse, and Gunson 1919–20) but may persist if there are obvious clinical signs of active carditis. Unless obviously due to digitalis (Thomson 1934), conduction defects in rheumatic fever are usually considered to be indications of non-specific inflammatory processes and vascular lesions in and around the conducting system of the heart (Walter 1938). Since the defect may be abolished by atropine (Bruenn 1937) it may also be due in part to an increase of vagal tone, this being probably a result of over-activity of vagal nerve-endings in the heart (Keith 1938). The deflexion T was inverted, diphasic, or otherwise abnormal in 9 cases. Serial records by standard limb leads are useful in showing when abnormalities of T begin and whether they pass away. Chest leads, both apical and sternal, were used in 10 cases of rheumatic carditis, 8 being mild, 2 severe; 2 disclosed an abnormality of T which was not shown by the standard limb leads. Right axis-deviation was found in 13 and left axis-deviation in 12; both are more frequent in recurrent attacks than in a first attack of rheumatic fever. Ventricular extra-systoles were recorded in 6 cases and auricular fibrillation in 5. Interference dissociation (Bain 1939) was never recorded. In rheumatic fever without apparent carditis electrocardiograms, especially daily records by chest leads, afford a delicate means of revealing early damage to the myocardium; but they are often normal although the clinical evidence of carditis is beyond doubt.

In a second, less frequent, group of cases the carditis begins more acutely, the fever persists perhaps for several weeks, the heart's rate remains too fast even although the fever has subsided, endocardial murmurs

* The St. Cyres lecture for 1939 delivered on June 8.
† I have to thank Dr. F. H. Vann for an analysis of these cases.

become audible, and the sedimentation-rate remains high. Electrocardiograms are not needed for diagnosis; they are more often abnormal but may present no significant alterations a fortnight before an acute case ends fatally. If the patient survives, the inflammatory process in the heart ultimately undergoes fibrosis but, like a tuberculous lesion in the lung, it seldom heals; it merely becomes quiescent and is repeatedly liable to exacerbation. Thus, in the course of years there may be many cycles of activity alternating with quiescent phases, each of which may last for years.

A third, and smaller, group comprises the monocyclic cases in which the disease begins acutely, continues for days, weeks, or months, and usually ends fatally. It sometimes pursues a fulminant and speedily fatal course. The most striking example is that rare and mysterious condition, rheumatic hyperpyrexia. In 2 instances this arose during a first attack of rheumatic fever and in 2 during a recurrence, the temperatures rising to 106·7° F. on the fifteenth day, 108° F. on the sixteenth day, 108·8° F. on the seventh day, and 109° F. on the sixth day respectively. Neither the antecedent history nor the early features of the illness in these 4 cases gave any premonition of impending death. Another virulent and fatal form of rheumatic carditis, fortunately rare, resembles acute septicæmia with a purpuric eruption, to which Libman (1923) directed attention. This eruption is to be distinguished from that in subacute bacterial endocarditis and from a scorbutic eruption in chronic congestive heart-failure.

Of the many conditions for which acute rheumatic carditis may be mistaken the commonest is the febrile polyarthritic form of gonococcal arthritis, in which the complement-deviation test is, in my experience, always negative. Repeatedly negative blood-cultures and the absence of splenic enlargement and of Osler's nodes are foremost signs that help us to exclude subacute bacterial endocarditis. Acute staphylococcal osteomyelitis and pyæmia may deceive even a physician of ripe experience, especially if a cardiac complication, such as acute pericarditis, is an early sign, or if the pyrexia begins to subside after the administration of salicylate. The presence of subcutaneous rheumatic nodules, erythema marginatum (Keil 1938) or erythema nodosum (Edström 1937) will help to exclude carditis of septic origin. I have seen the initial phase of an intensely acute rheumatic carditis simulate enteric fever and abortus fever. In one case the onset of jaundice on the seventh day, yielding an icterus index of 33, suggested leptospirosis until that disease was excluded by agglutination and inoculation tests. The differentiation from acute tuberculosis seldom occasions any difficulty.

Prognosis

Except in fulminant cases the immediate prognosis is usually favourable; but it is grave if the aortic as well as the mitral valve become affected, if the pyrexia be prolonged for several weeks, if pronounced tachycardia persist after the patient has become afebrile, and if the heart fail and the lungs and liver become congested and the lower limbs dropsical. Even such a patient, however, may survive the acute phase of the disease and be leading a useful and happy life several years later. Sodium salicylate is powerless to arrest or to mitigate carditis; the efficacy of scarlet-fever antitoxin and other forms of serotherapy and of subcutaneous injections of hæmolytic streptococcal endotoxin is still open to doubt. Sulphanilamide is, I am convinced, not merely ineffective but also may aggravate the arthritic pains and increase the temperature.

A final opinion cannot yet be given upon the prognostic significance of electrocardiographic abnormalities in acute rheumatic carditis. Some writers (Robinow et al. 1936, Bland and Jones 1938) regard them as of little or no value; others (Grenet et al. 1939) comment on the grave significance of S–T abnormalities persisting for more than a month, auricular fibrillation, and progressive deviation of the electric axis. In my opinion the prognosis in this, as in all other affections of the heart, should never be founded solely or even mainly upon any one method of studying the morphological and functional state of the organ.

While still under my observation 26 patients (9·7 per cent.) of the series of 268 died, 14 being between the ages of eleven and twenty-five and 8 being over twenty-five; 9 died during a first attack of rheumatic fever, 3 had one attack before the fatal recurrence, 8 had repeated attacks, and 6 died of congestive heart-failure without any fresh clinical manifestations of rheumatic fever. This classification (Gross and Ehrlich 1934) is misleading in respect of the fourth group, because at least 2 of the 6 patients in that group had acute carditis implicating the tricuspid, mitral, and aortic valves, this being in accord with the well-established fact that in a high percentage of fatal cases of rheumatic heart-disease there is active carditis which has seldom been recognised during life.

Morbid Anatomy

Fourteen cases were examined post-mortem by Prof. A. Murray Drennan and members of his staff, to whom I gladly acknowledge my indebtedness for help in this investigation. Even although there are obvious rheumatic lesions of the pericardium and cardiac valves, it is exceedingly doubtful if acute rheumatic carditis can be recognised without microscopical examination.

HEART

The anatomical changes in the heart are due in various degrees to (1) non-specific exudative, degenerative, and infiltrative processes comparable to similar changes in tuberculosis; (2) lesions of mesenchymal cells of connective tissue—the "connective-tissue skeleton" (Poynton 1928, 1936)—and of blood-vessels, leading to the formation of the specific granuloma, Aschoff nodule, or Aschoff body; (3) vascular lesions; and (4) lesions of myocardial fibres. The degree to which these changes attain varies greatly in individual cases according to the intensity and duration of the disease.

(1) *The non-specific changes* are similar to those in other states of infection, toxæmia, and the hyperergic response to foreign protein (Klinge 1933a). We constantly find fibrinoid degeneration of collagen connective-tissue fibres, mainly perivascular in distribution, œdema usually more diffuse, and leucocytic infiltration. These changes, which collectively represent the Arthus phenomenon (Werner 1938), begin concurrently, before any specific rheumatic lesions have developed, yet may persist throughout. Fibrinoid degeneration was most intense in the heart of a woman, aged thirty-two, who succumbed ten and a half weeks after the onset of rheumatic fever. Œdema of the myocardium, analogous to exudation of fluid into a joint, was particularly severe in a girl, aged nine, who had extensive rheumatic vegetations on the mitral valve. The cellular infiltration, mainly lymphocytic, is sometimes scanty

and at others intense, especially in and near the attachment of the cusps of affected valves. Fatty change in myocardial fibres is common. Necrosis is rare; it was most pronounced in a boy, aged fourteen, whose final recrudescence of rheumatic fever with endocarditis of mitral, aortic, and tricuspid valves lasted a month.

(2) *The specific rheumatic granuloma*, or Aschoff nodule, was sought for in 12 and found in 9 cases, abundantly in some and scantily in others. These microscopic nodules are more numerous in the ventricles than in the auricles; to this rule there was one exception. Lying usually in close proximity to myocardial arterioles, less often subserous, they consist of basophilic mesenchymal cells, some of which are multinucleated giant cells, and of collagen which has undergone fibrinoid degeneration and stains deeply with eosin. At first spherical, the nodules become successively oval and fusiform; gradually they become fibrosed; and late involution forms are represented by scars.

Following Klinge (1933b) we may differentiate young nodules less than four weeks old from those more mature and from late involution forms. Nodules in various stages of development, young and old, may often be seen in one and the same section. No attempt was made to classify nodules according to the criteria laid down by Gross and Ehrlich (1934), who recognised seven types; but the "mosaic" forms in perivascular, endocardial, and subendocardial sites can readily be distinguished from "reticular" forms in loose connective tissue. At the periphery of a nodule and around it there is sometimes a zone of lymphocytic infiltration. In acute cases, especially those ending during the ninth week of a first attack of rheumatic fever, the cells of the nodules are said to undergo fusion and great enlargement, forming "huge syncytial masses" which surround the scanty central collagen material (Gross and Ehrlich 1934). There was no case of this nature in my series. The Aschoff nodule, which must not be mistaken for a focal aggregation of leucocytes, is almost universally considered to be specific for rheumatic fever, as is the Langhans giant-cell system for tuberculosis and the Greenfield (1878) multinucleated-cell system for lymphadenoma. Subcutaneous rheumatic nodules have essentially the same structure as Aschoff nodules in the heart. Widespread dissemination of nodules in the pharynx, larynx, trachea, œsophagus, and elsewhere has been reported (Sarafoff 1932); a search for nodules in those sites in one of my cases proved fruitless.

If a case ends within a fortnight of a first acute rheumatic attack, Aschoff nodules, it is said, have not yet developed; only initial non-specific inflammatory lesions will be found (Klinge 1933b), and they will be widespread if the disease has been particularly severe (Skworzoff 1938). Indeed, non-specific exudations and infiltrations and gross destruction of muscle-fibres are regarded by Fahr (1938) as the morphological basis of hyperpyretic rheumatic fever. In a man, aged thirty-four, who developed wild maniacal delirium when the temperature rose to 106·7° F. on the fifteenth day of a recurrence we found fully formed but not fibrosed Aschoff nodules with small perinodular zones of leucocytes and considerable œdema of the myocardium but little fibrinoid degeneration and no serious destruction of muscle-fibres. In a woman, aged twenty-five, whose temperature rose to 108·8° F. on the seventh day of a first attack of rheumatic fever we found many young Aschoff nodules but, except for œdema, few non-specific changes. In three hyperpyretic cases a large soft spleen and numerous small subpleural or subepicardial hæmorrhages, and in one a large subendocardial hæmorrhage, indicate an analogy between hyperpyrexial rheumatic fever and an acute septic infection.

(3) *Vascular lesions* of the coronary arterial system are common. Most of them are non-specific and of similar nature to those in many general infections, as described by Cowan (1904). His early observations have been extended by many subsequent writers, notably Coombs (1908–09); Perry (1930), who has shown that in rheumatic fever the whole of the coronary tree is liable to be damaged; Klinge (1933); Chiari (1938); and Karsner and Bayless (1934). In a girl, aged seventeen, whose death was due to a third recurrence of acute rheumatic carditis the main coronary arteries showed diffuse unequal intimal thickening with patchy hyalinisation of the media, sparse round-cell infiltration, and fragmentation of the elastica. Intimal hyperplasia of small myocardial branches, whereby their lumen becomes greatly reduced, is a common but not invariable lesion. Intimal œdema was most conspicuous in a girl, aged nine, an acute monocyclic case of five months' duration. Medial œdema, causing the "reticular state" described by Rabé (1902), was best seen in a girl, aged eleven, whose kidneys were the seat of cortical necrosis. In the adventitia we find œdema and hyperplasia; it is in the adventitia of myocardial arterioles that Aschoff nodules usually develop. The coronary lesions are not identical in each case or in all parts of the coronary tree. They may be mainly intimal in some vessels and medial in others; there may be gross œdema of the myocardium yet little œdema of the walls of coronary branches. In none of my cases was there necrotising arteritis (Gross, Kugel, and Epstein 1935) or thrombosis with myocardial infarction (MacCallum 1925, Schwarz 1932).

Although the coronary vessels are more often and more seriously implicated than other portions of the vascular system, similar but usually less intense lesions may develop in any part of the aorta (but mainly in its abdominal portion) and in the pulmonary arteries and mesenteric arteries (Chiari 1932, 1938). More than thirty years ago Huchard (1905) recognised acute rheumatic aortitis. Pappenheimer and VonGlahn (1927) described a diffuse reaction of the intima and subjacent part of the aortic media, comparable to that of the auricular endocardium (MacCallum 1925), and focal lesions following the distribution of vasa vasorum which have been shown to penetrate the wall of the aorta and other arteries from within as well as from without (Winternitz et al. 1938). Infiltration of all three coats of the aorta with cells, mainly lymphocytes and plasma cells, and "mucoid" swelling and cystic change of the media, with fibrinoid and œdematous swelling of connective tissue and occasional Aschoff nodules, are reported by Klinge and Vaubel (1931), Schulz and Klinge (1933), and Lieber (1933). At the root of the aorta and that of the pulmonary artery the commonest lesion, according to Kugel and Epstein (1928), is a diffuse cellular infiltration, which, they suggest, may account for some of the transient auscultatory signs arising during rheumatic fever. Relative pulmonary incompetence in that disease has been ascribed by Scherf (1930) to those lesions. I cannot recall any case of this nature, but a comparable defect at the aortic valve, which was intact at autopsy, once came under my notice. Fibrous scars in the walls of aorta and pulmonary arteries may be found in the subjects of old inactive rheumatic disease (Wild 1933, Rössle 1933).

(4) *The myocardium.*—Attention has already been drawn to the all-important matter, the state of the myocardial fibres. Granular degeneration, fatty change, hyalinisation, and atrophy are often seen; necrosis is less common and less extensive. The formation of Aschoff nodules in the valves of the heart and their subsequent fibrosis may be as significant as the non-specific inflammatory changes in causing rheumatic valvular defects; but the clinical manifestations of myocardial weakness are to be ascribed not to the development of Aschoff nodules in the walls of the heart but to the action of a rheumatic toxin on the myocardium and to its ischæmia consequent on non-specific exudations, degenerations, and infiltrations.

BRAIN

Although the heart is the organ most often injured by rheumatic fever, there is a close association between acute rheumatic carditis and rheumatic affections of other viscera, notably the brain, lungs, and kidneys. The character and multiplicity of the cerebral lesions in Sydenham's chorea (Gamper 1935) lie beyond the scope of this lecture, but reference may be made to other cerebral affections. In 10 cases of the present series there developed delirium and other acute psychoses, which passed off except in 1 fatal hyperpyrexial case. There was cerebral embolism in 1 case and cerebral œdema in 1, a man, aged forty-one, who had a terminal epileptiform seizure. A case of much interest was a girl, aged thirteen, who developed headache, rigidity of the neck, and a meningitic cry twelve hours before death. In the frontal and parietal cortex of both sides Dr. A. C. P. Campbell found multiple small (1–2 mm.) foci of ischæmic degeneration, some recent, showing pyknotic and necrotic nerve-cells without glial reaction, and others older, showing contraction and fibrous gliosis. Arterioles here and there were plugged with granular eosinophil masses of thrombus, presumably embolic. There was no sign of meningitis. This case, which resembles one of Edström's (1937), was not one of subacute bacterial endocarditis, in which infarcts are common; the clinical history and the lesions in the heart were characteristic of rheumatic carditis. In similar cases of "cerebral rheumatism" endarteritis of small cerebral vessels and acellular areas in the brain have been recorded by Winkelman and Eckel (1932).

LUNGS

Specific rheumatic lesions are seldom found in the lungs (Debré et al. 1937) but may be seen in the interlobular septa (Fraser 1930). Neither they nor the subpleural hæmorrhages in fulminant cases cause clinical symptoms. Non-specific processes are more important and have been regarded as integral components of the disease (Gouley 1937). Acute pulmonary œdema, due to left ventricular failure, is rare; I have seen 2 cases; both ended fatally. Chronic venous congestion and œdema of the lungs are commoner. In severe cases of acute rheumatic carditis we may find collapse of the lower lobe of the left lung from compression of the bronchi by pericardial effusion or a greatly dilated heart; reflex immobilisation of the diaphragm has been claimed as another causal factor (Coombs 1924). In respect of its site, physical signs, and clinical course this basal pulmonary collapse is virtually identical with the condition termed "rheumatic pneumonia." This was observed in 9 patients, their ages ranging from seven to twenty-nine. The patch of consolidation, which is almost always at or near the angle of the left scapula, may be extensive or no larger than a half-crown piece. The X-ray appearances of the left lung field may indicate merely venous congestion (Gouley 1937) or be sufficiently distinctive to confirm the clinical diagnosis of consolidation. All 9 patients were gravely ill; of 6 who survived 1 was playing football six months later despite mitral stenosis. In a girl, aged fifteen, with dry pericarditis and a greatly dilated heart the left lower lobe was found at autopsy to be merely congested. In another fatal case, a girl, aged nine, with a greatly enlarged heart but no pericarditis, there was likewise no consolidation of the lung. Neither case presented lesions intermediate between infarcts and pneumonia (Mallory 1935) or firm patches of acute interstitial pneumonia "like solid indiarubber" (Fraser 1930). In other cases of "rheumatic pneumonia" there is gross hæmorrhage in the pulmonary tissues (Bland and Jones 1938), or there are focal areas of "splenisation"—namely, intense hyperæmia and proliferation of cells of alveolar walls (Melnick 1938) and their capillaries (Naish 1928). Proliferative alveolitis and intimal desquamation, followed by fibrinoid necrosis of the walls of alveoli, alveolar ducts, and bronchioles (Debré et al. 1937), and fibrinoid alveolitis with formation of hyaline membranes in the alveolar ducts, a process similar to that of acute fulminant pneumonia in influenza and of pneumonic plague (Hadfield 1938), have been recorded. Acute bronchopneumonia was observed in 2 cases and infarction of the lung in 2 others.

Pleurisy was found in 8 cases, and in 6 of these there was a sterile pleuritic effusion. The prognosis in these cases is almost invariably grave, but a boy, aged sixteen, was apparently well five months later. I have never seen either rheumatic pleurisy or rheumatic consolidation of the lung except in association with serious rheumatic carditis, failing which a provisional diagnosis of acute rheumatic disease of pleura or lung had always to be abandoned.

KIDNEYS

There is seldom clinical evidence of any renal affection except transient albuminuria during febrile phases of the illness. Even in fatal cases of acute rheumatic carditis microscopical examination of the kidneys sometimes discloses no abnormality. They were diseased in 4 of my cases.

CASE 1.—A woman, aged twenty-eight, who had experienced an initial attack of rheumatic fever at fifteen, was suffering from a second attack with severe polyarthritis and signs of acute and chronic carditis but no dropsy. The daily excretion of urine seldom fell below 1 litre and occasionally it rose to 2 litres. The urine was sterile and contained albumin, blood, and epithelial and granular tube-casts throughout her stay of ten weeks in hospital. The blood-urea nitrogen was 19–22 mg., the non-protein nitrogen 37–41 mg., and the creatinine 3·3–3·6 mg. per 100 c.cm. The arterial blood-pressure varied from 130/70 to 100/70.

CASE 2.—At thirty-five a miner suffered from rheumatic fever. At thirty-nine he was febrile and breathless and he passed 1400–2200 c.cm. of urine daily, which contained albumin and blood. The kidneys showed old focal scars and recent glomerular changes—namely, cell-proliferation, thrombosis in tuft vessels, and adhesion to capsule. The mitral and aortic valves showed acute and chronic rheumatic valvulitis, and many Aschoff nodules in various stages of development were seen. The glomerular lesions in this case resemble those described by Bell (1932), who found a moderate degree of acute diffuse glomerulitis in 21 per cent. of 104 cases of active rheumatic carditis.

CASE 3.—A girl, aged seventeen, who had suffered from rheumatic fever at twelve, thirteen, and sixteen, had an acute exacerbation which ended fatally in four months. During the terminal three weeks the face was pale and puffy and the urine contained albumin and traces of blood. The blood-urea nitrogen was 35 mg. per 100 c.cm. There was acute diffuse inflammation of the glomeruli; their tufts were swollen and highly cellular, the excessive cells being round cells or proliferated endothelium; and there were no vascular or interstitial changes in the kidneys.

Acute glomerulonephritis, whether of toxic origin or secondary to non-specific vascular lesions, is rare in rheumatic fever. Goldring and Wyckoff (1930) did not find nephritis in any of their 16 patients; Baehr and Schifrin (1932) found 1 example in 118 cases; Fishberg (1939) saw only 2 undoubted cases; in Edström's (1937) 850 cases there were 17 of acute glomerulonephritis; Klinge (1932) has observed a series of cases with focal glomerulonephritis and subacute diffuse glomerulonephritis with hæmaturia, tube-casts, and retention of nitrogen. Acute nephritis was found in 10 of Salvesen's (1938) 212 cases of rheumatic fever. The nephritis is usually mild, takes a favourable course, and ends in complete recovery; but 2 of Salvesen's cases developed uræmia, and Loeb's (1931) patient, that of Baehr and Schifrin (1932), and 4 of Edström's (1937) patients died of uræmia.

Vascular lesions in the kidneys are also seen apart from glomerulonephritis. VonGlahn and Pappenheimer (1926) regarded exudation of fibrin with destructive and cellular changes in and around the vessels as specific. Klinge (1933c) constantly finds perivascular lymphocytic infiltration, especially in the cortex; glomeruli, arteries, arterioles, and veins may be surrounded by dense zones of lymphocytes. In 1 of his cases there were perivascular cellular nodules, like berries hanging on a stalk, with arterio- and arteriolo-necrosis of adjacent vessels, as previously described by Fahr (1921). The endothelium may be swollen and proliferated (Baehr and Sacks 1923), but intimal lesions are inconstant (Blaisdell 1934). Rheumatic granulomas in the kidney are exceedingly rare; it is doubtful if they alone ever cause glomerular and tubular lesions.

CASE 4.—A girl had rheumatic fever at eleven. At thirteen she suffered from a second attack with carditis. A year later congestive heart-failure with dropsy supervened. The mitral and aortic valves showed acute and chronic valvulitis; there were acute rheumatic vegetations on the tricuspid valve; and in the myocardium were old and recent Aschoff nodules but no vascular lesions. Both kidneys showed cortical necrosis extending inwards to a depth not exceeding 2 mm. In the cortex were also acute cellular foci resembling the perivascular nodules described by Klinge (1933c). Reference has already been made to the focal cerebral lesions in this case. There was no indication of the cortical necrosis being secondary to thrombosis in cortical vessels and glomeruli, or of necrosis and fibrinoid degeneration in the walls of interlobular arteries, as described by von Zalka (1933).

So far as is known, the only previous case of cortical necrosis of the kidneys in acute rheumatic carditis was one in which the renal arteries were the seat of proliferative and necrotic lesions of such intensity that necrosis of the entire cortex of both kidneys ensued (Sacks 1925–26).

The other abdominal viscera are less often affected. Jaundice, a rare complication, may indicate a rheumatic hepatosis rather than hepatitis. Granular, fatty, and necrotic changes of liver-cells are not specific. Aschoff nodules have been found in the capsule of the liver (Klinge 1932). There may be nodular hyperplasia and necrosis of the intima of veins within the organ (Rössle 1933); and a similar endophlebitis has been found in the spleen and pancreas (Coronini and Oberson 1937).

Conclusions

To what conclusions does a study of acute rheumatic carditis lead us? We realise more fully the risk of cardiac lesions arising during the course of rheumatic fever. It is true that in some cases those lesions must be transient, because life-assurance companies subsequently accept those lives as first-class and old age is attained in the enjoyment of good health. At the other extreme is the grave case in which profuse lesions in the walls of the heart and one or more of its valves lead to a fatal issue. If the patient survives the early acute phase, the cardiac lesions have presumably been less intense and less extensive, but he will almost certainly become a cardiac cripple. Even although the valves remain intact, the myocardial lesions may lead to fibrosis and thus to hypertrophy and dilatation of the heart without any valvular fault that might entail an increase of the heart's work. Further, the more we know of the vascular and visceral changes in rheumatic fever, the better do we realise that the damage is not confined to the heart but may be much more extensive. I have never been able to subscribe to the rheumatic origin of peritonitis (Poynton 1928), polyserositis (Edström 1937), mesenteric lymphadenitis (Ash 1936), acute appendicitis, and other abdominal disorders in childhood (Guptill 1934, Wolffe and Brim 1936); nor have I seen a "rheumatic aneurysm" (Edström 1937); but acute vascular lesions in coronary arteries and arterioles and in the aorta and pulmonary arteries may perhaps be the starting-point of chronic degenerative changes in those vessels. Moreover various forms of granular contracted kidney, including malignant nephrosclerosis, it is thought, may be end-results of acute rheumatic vascular and glomerular lesions (Klinge 1932, Fahr 1938). The hypothesis that ascribes the origin of arteriosclerosis, as distinct from atheroma and medial calcification, to widespread rheumatic vascular lesions, systemic and splanchnic, has as yet little to commend it.

A deeper insight into the nature and extent of visceral rheumatism indicates clearly that the cardinal principles in the treatment and management of patients affected by rheumatic carditis should be followed as strictly and ceaselessly as is customary in the care of those who suffer from tuberculosis. Our goal, however, is not the treatment of the cardiac cripple but the prevention of rheumatic fever by a strict adoption of all appropriate measures of personal and social hygiene.

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FAMILIAL ADENOMATOSIS OF COLON AND RECTUM

ITS RELATIONSHIP TO CANCER

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In adenomatosis of the colon and rectum (polyposis intestini) the whole mucosal surface of the rectum and colon is studded with innumerable adenomatous proliferations of the mucous membrane. The disease usually affects several members of a family and almost invariably leads to carcinoma.

A description of this disease, with the records of three families, given by one of us (Lockhart-Mummery 1925) concluded with the following summary:—

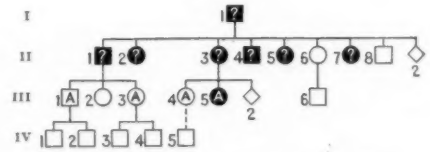
(1) Adenomatosis of the large bowel is a condition which tends to develop in succeeding generations in the same family. (2) Individuals with multiple adenomata of the large bowel almost invariably develop cancer in one or more of the adenomata after a few years. (3) The members of families with a hereditary tendency to multiple adenomata tend to die of cancer of the large bowel, and at an early age.

The experience of the last fourteen years amply confirms these conclusions. We have had an opportunity during this period of observing the course of the disease in ten families, whose history is recorded in the accompanying genealogical tables (families I–X), which very convincingly demonstrate the general familial character of the disease and its close relationship to cancer. The information set out in these tables has been derived from various sources. The starting-point in each case was a patient with adenomatosis. We obtained as complete a family history as possible from the patient, asking particularly about the present health or cause of death of parents, grand-parents, uncles, and aunts. Almost invariably we found that the patient was aware of the high incidence of death from intestinal cancer amongst his relations. We tried to get in touch with as many as possible of the surviving relations and to carry out sigmoidoscopic examinations. It was impossible to find out whether or not deceased relations had also been affected by adenomatosis; hence we have marked these cases with a ? in the tables to show that they died of cancer of the intestine, but that we have no information about adenomatosis. Probably in most cases the fatal cancer was secondary to adenomatosis. Some of the surviving descendants marked in the charts as unaffected may develop the disease in the future.

Although this disease is familial it does not manifest itself as a rule before childhood or puberty. The age at which adenomata begin to develop varies in different families. We tried to collect data on this point and in twenty cases obtained information which seemed to be reliable. The average age at which adenomata were discovered was 22. The youngest patient was 8 and the oldest 43. The tumours were probably present for at least a year or two before they were discovered; so the average age at which adenomata developed may be taken as about 20. In two families recently investigated by McKenney (1936) the average age was 19½.

Malignant disease secondary to adenomatosis is characterised by its early age of onset and the fact that more than one primary focus of carcinoma may

FAMILY I



I—(1) Death from cancer of rectum, aged 42.

II—(1, 2, 3, 4, 5, 7) Death from cancer of rectum, aged 46, 52, 54, 39, 27, and 44 respectively.

III—(1) Adenomatosis developed at 43 years, now aged 55; no sign of carcinoma. (3) Multiple adenomata found at 37 years, now aged 40; no sign of carcinoma. (4) Multiple adenomata found at 11 years, colectomy for adenomatosis at 31 years; no sign of carcinoma; now aged 46 and in good health. (5) Death from cancer of colon, aged 33.

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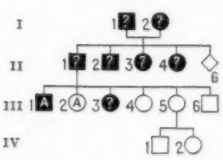
FAMILY II



FAMILY III

FAMILY II—I—(1 and 2) Death from cancer of rectum (ages unknown).

II—(1) Death from cancer of rectum, aged 44. (2, 3, and 4) Death from cancer of rectum (ages unknown).

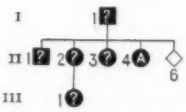
III—(1) Colectomy for multiple adenomata at 30 years; died from cancer of rectum, aged about 36. (2) Adenomata found at 14 years; colectomy at 25 years; now aged 46. (3) Death from cancer of the liver (age unknown).

FAMILY III—I—(2) Death from cancer of rectum, aged 60.

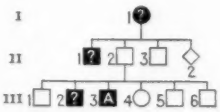
II—(1) Death from cancer of rectum, aged 46.

III—(1) Treated for adenomatosis since 12 years of age, now aged 41. (2) Colectomy for adenomatosis at age 22; has remained well since (12 years).

FAMILY IV



FAMILY V



FAMILY IV—I—(1) Death from "cancer in pelvis," aged 62.

II—(1) Death from cancer of rectum, aged 32. (2) Death from "abdominal growth," aged 45. (3) Death from cancer of rectum, aged 38. (4) Perineo-abdominal excision for cancer of rectum, aged 38; died from recurrence one year later.

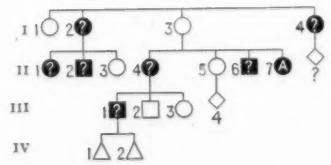
III—(1) Death from "abdominal" cancer (age unknown).

FAMILY V—I—(1) Died aged 40 after operation for cancer.

II—(1) Death from intestinal cancer (age unknown).

III—(2) Death from intestinal cancer, aged 47. (3) Bleeding from rectal adenomata at 15 years; perineo-abdominal excision for multiple carcinoma of rectum associated with adenomatosis at age of 38 (three separate malignant growths—see fig. 3); alive and well 1½ years later.

FAMILY VI

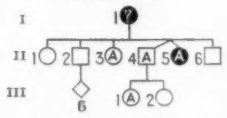


I—(2) Colostomy for malignant disease at 33 years; died 3 weeks later. (4) Death from hepatic metastases.

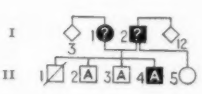
II—(1) Death from "abdominal" cancer, aged 50. (2) Death from cancer of intestine, aged 45. (4) Death from cancer of rectum, aged 53. (6) Death from cancer of rectum, aged 53. (7) Perineo-abdominal excision for cancer of rectum associated with adenomatosis, aged 53; alive and well 1½ years later (fig. 2).

III—(1) Cancer of intestine, aged 23, treated with radium.

FAMILY VII



FAMILY VIII



FAMILY VII—I—(1) Death from cancer of colon, age unknown.

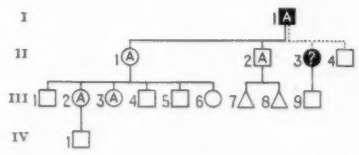
II—(3) Died aged 40; known to have suffered from adenomatosis. (4) Symptoms of adenomatosis, aged 30; colectomy aged 41; died after operation; no sign of carcinoma. (5) Twin sister of II (4); symptoms of adenomatosis developed at same age as twin brother; died, aged 41, from intestinal cancer.

III—(1) Adenomata found at 14 years; now aged 17 and under treatment.

FAMILY VIII—I—(1) Death from intestinal cancer, aged 41. (2) Death from cancer of colon, aged 50.

II—(2) Multiple adenomata found at 24 years; now aged 31 and under medical supervision. (3) Colectomy for adenomatosis, aged 24; died after operation; no sign of carcinoma. (4) Adenomatosis and inoperable cancer of rectum found at 21 years; died aged 22.

FAMILY IX

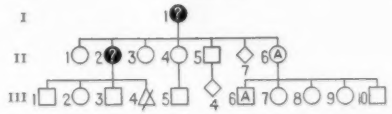


I—(1) Death from cancer of rectum; age unknown.

II—(1) Symptoms of adenomatosis at 21 years; patient now aged 50; no sign of carcinoma but has had several adenomata removed by local excision during last 7 years. (2) Suffers from adenomatosis; now aged 49. (3) Death from carcinoma of colon, aged 32.

III—(2) Symptoms of adenomatosis at 14 years; now aged 29. (3) Symptoms of adenomatosis at 8 years; now aged 27.

FAMILY X



I—(1) Death from cancer of rectum, aged 42.

II—(2) Colostomy for inoperable intestinal cancer; died 3 years later. (6) Symptoms of adenomatosis at about 30 years; perineo-abdominal excision for adenomatosis at age of 37; no sign of malignancy (fig. 1).

III—(6) Symptoms of adenomatosis at 17 years; now 18.

EXPLANATION OF GENEALOGICAL TABLES

A Ⓐ	Male or female with adenomatosis.
? ?	Male or female with cancer but not examined for adenomatosis.
A A	Male or female with cancer and adenomatosis.
⊘ ∅	Death in male or female offspring under 7 years.
△	Sex unknown.
⍋	Death in infancy, sex unknown.
◇ ?	Siblings (brothers and sisters) not individually represented. Number (if known) is indicated below; otherwise a note of interrogation is used.

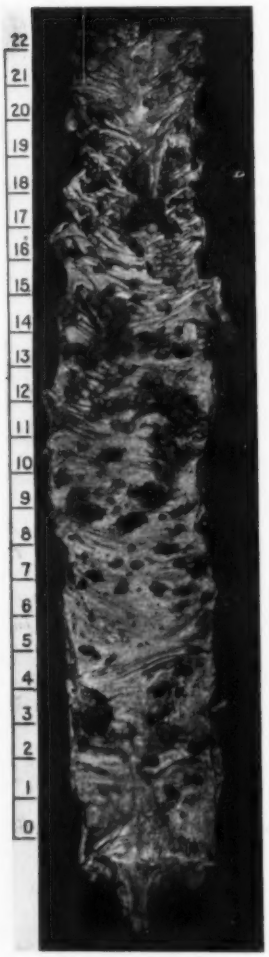


FIG. 1—Rectum and colon showing widespread adenomatosis (family X, II (6)).

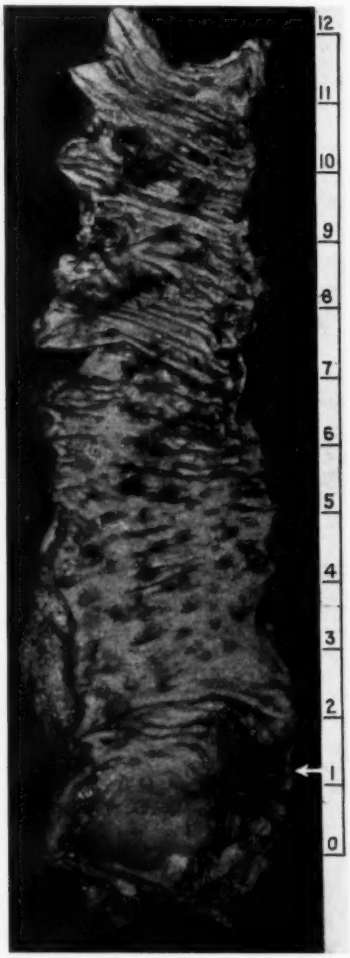


FIG. 2—Carcinoma (indicated by arrow) associated with adenomatosis (family VI, II (7)).

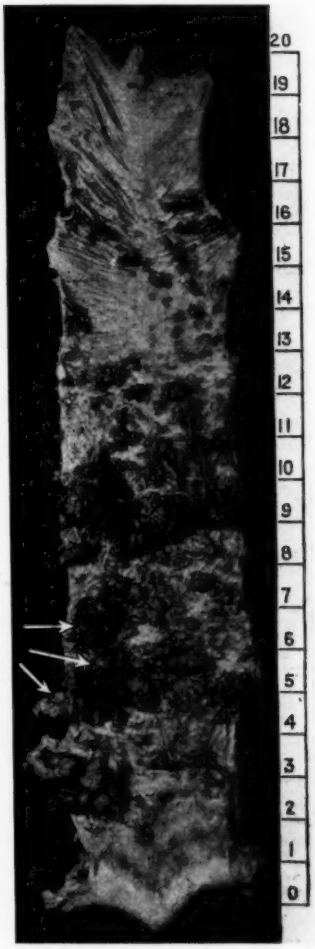


FIG. 3—Multiple carcinoma (indicated by arrows) associated with adenomatosis (family V, III (3)).

be present. Among the general population it is rare for cancer of the rectum or the colon to develop before 40–50, but in families affected by adenomatosis it often begins to develop at 30–40 or even earlier. The age of death from cancer in adenomatosis families is also younger by about twenty years than the average age of death from this disease in the general population. In these families the average age of death from cancer of the intestine was 42. The youngest was 22 and the oldest 60. In only a few cases were we able to collect reliable information about the exact age at which cancer began, but it was generally in the early thirties. Although there may be considerable variation in different families, as a general rule in families affected by adenomatosis the tumours begin to develop about 20, malignant changes may be expected about fifteen years later, and untreated cases die from cancer in the early forties.

It is obvious from the genealogical tables that the disease may be transmitted by either sex. Since in most cases only one parent was affected, we have omitted from the tables the unaffected partner in the marriage. In two cases, however, we have evidence that both husband and wife died of cancer (families II and VIII), and in both of these families most of the

FIG. 4—Section through rectal mucosa in a case of adenomatosis. (× 8.)

descendants developed adenomata at an early age. Family VII is also of special interest because of the presence of twins (generation II, 4 and 5). Symptoms of adenomatosis developed in both twins about 30. One was treated by colectomy at 41, but he succumbed to the operation. His twin sister died of intestinal cancer also at 41.

FIG. 5—Section through rectal adenoma in a case of adenomatosis. (× 10.)

The appearance of the mucosa of the colon and rectum in adenomatosis is shown in figs. 1, 2, and 3, and the histology of the adenomata in figs. 4 and 5. The onset of malignancy can generally be detected by changes in the colour and consistence of the adenomata. Tumours with active epithelial proliferation are always darker than quiescent growths; but, when cancer develops, the growth becomes dark red or dark brown and much firmer than the surrounding adenomata. It is common to find evidence of malignant degeneration in two or three different regions.

The familial character of adenomatosis is obvious not only from these charts but also from the other cases reported by Dukes (1930). Most observers of this disease have concluded that the defect is inherited as a Mendelian dominant. The disease is not congenital in the ordinary sense of the word, since it does not manifest itself for several years; but it is certainly due to an inherited defect, and the most likely explanation seems to be that it is caused by a gene mutation. Evidence is steadily accumulating for the view expressed by one of us (Lockhart-Mummery 1934) that tumours are the result of a genetic change in a normal growing somatic cell. This explanation is applicable also to adenomatosis, in which disease the genetic defect appears to be a tendency to a more rapid growth of the intestinal mucosa, leading first to hyperplasia and later to adenomata. This defect may be explained as a result of a gene mutation, and the liability to it is handed on from one generation to the next. The more rapid growth of the intestinal mucosa increases the probability of a further gene mutation responsible for malignancy, a change which can only take place when cells are undergoing mitosis. Because of the more rapid growth of the intestinal epithelium there must be a greater frequency of mitotic division, and this again increases the probability of a further gene mutation which manifests itself as cancer. In a rapidly growing adenoma the chance of this happening is much greater than in normal mucosa where mitosis only takes place at comparatively rare intervals.

Our explanation suggests, therefore, that familial adenomatosis is the result of an inherited instability of the epithelial cells of the large bowel, which renders their nuclei peculiarly liable to undergo mutation for excessive rate of growth. We regard the increased incidence of cancer of the colon and rectum as a secondary phenomenon dependent on the fact that mitotic division is more frequent in proliferating adenomata than in normal mucosa.

The treatment of adenomatosis presents a difficult problem. Constant medical supervision is necessary so that a radical excision may be undertaken as soon as malignancy is detected. One patient in this series was treated by deep X rays to the whole large bowel. It was doubtful if any real improvement resulted, and the progress of the disease was certainly not arrested. Five cases were treated by complete excision of the colon, and four of these patients are alive and well. This formidable operation may be indicated in some cases but is not necessary for all.

We express our gratitude to all our colleagues at St. Mark's Hospital who allowed us to consult the notes of their cases, to the doctors to whom we have written for further details of cases, and most of all to patients and relations who have coöperated by submitting to examinations and providing information. Much of the clerical work has been carried out by Miss S. H. Douglas, receiving a temporary grant from the British Empire Cancer Campaign, to whom we also express our obligations.

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BACTERIÆMIA FOLLOWING TONSILLECTOMY

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DURING the last ten years at least six attempts have been made to determine the frequency with which bacteriæmia follows tonsillectomy (Rubin, Epstein, and Werner 1929, Schwartz and Frisch 1929, Bartlett and Pratt 1931, Wirth 1932, Fischer and Gottdenker 1936, Southworth and Flake 1938). My excuse for adding to them is the lack of agreement in the recorded observations. The discrepancies, which range from a failure to demonstrate a single positive blood-culture (Rubin et al. 1929) to a 32 per cent. positive rate (Fischer and Gottdenker 1936), may result from variations in the technique of blood-culture and from differences in the time after operation at which a sample of blood was taken.

TECHNIQUE OF BLOOD-CULTURE

In the present investigation a technique has been used similar to that adopted in a previous inquiry into bacteriæmia following dental extractions, when many positive blood-cultures were obtained within a few minutes of operation (Okell and Elliott 1935, Elliott 1938). This procedure allows of comparison between the relative frequencies of immediate blood-stream infection following these two types of operation, and it seems reasonable to assume that what proved to be the best moment for taking a sample of blood after dental extraction would be the best moment for taking it after tonsillectomy.

Samples of 4–10 c.cm. of blood were withdrawn from an arm vein immediately before and within five minutes after tonsillectomy. Both specimens were taken while the patient was under the influence of a general anæsthetic—ether or gas and oxygen. In a few instances a third sample of blood was taken a little later.

Each sample of blood was divided into two or three equal parts, and these were inoculated into 20 c.cm. quantities of sodium citrate, Liquoid* (a synthetic polymer of sodium anethol sulphonate), citrate saponin, or saponin-liquoid broth. In the early part of the investigation citrate and saponin-citrate broth were used exclusively, but subsequently the citrate broth was replaced by liquoid and saponin-liquoid broth. The final concentration of sodium citrate, saponin, and liquoid in the blood-broth mixtures lay between 0·17 and 0·18 per cent., 0·042 and 0·047 per cent., and 0·017 and 0·019 per cent. respectively. The blood broths were incubated aerobically at 37° C. for seven days, after which subcultures were made on to 5 per cent. horse-blood agar and into 0·1 per cent. glucose broth; these subcultures were incubated for two days at 37° C.

In thirty-five subjects "pour-plates" also were made and incubated at 37° C. aerobically for seven days to obtain a count of the viable organisms if the culture proved positive. This procedure was subsequently discontinued, for, even when the blood-culture was positive, bacteria could never be demonstrated in numbers greater than 1 per c.cm. of blood.

BLOOD-CULTURES AFTER TONSILLECTOMY

Table I summarises the results of blood-culture immediately after tonsillectomy. In 14 cases an additional sample of blood was taken for culture one to three hours after operation. *Staphylococcus albus* was isolated from 1 of these samples, which had been taken two hours after tonsillectomy; the blood taken for culture both before and immediately after operation was sterile. The remaining 13 samples were sterile, although positive blood-cultures had been obtained in 4 of these subjects immediately after operation. It appears, therefore, that the bacteriæmia following tonsillectomy is of short duration, as is the case after dental extraction. The organisms recovered in the 38 positive cases shown in table I were:—

TABLE I—BACTERIÆMIA FOLLOWING TONSILLECTOMY IN 100 CASES

Operative technique	Cases examined	Result of blood-culture after operation	Nature and incidence of bacteriæmia						
			Str. viridans	*Str. pneumoniæ*	Hæmolytic streptococcus	Hæmophilus	Staphylococcus	Corynebacterium	Bacillus (aerobic spore-bearing bacteria)
Blunt guillotine	67	25+ (37%)							
Dissection	33	13+ (39%)							
Total ..	100	38+	12	2	7	6	5	4	2

+ Indicates that bacteria were isolated from the blood-cultures.

Streptococcus (21).—These were classified in the first instance according to the appearance produced by surface colonies on 5 per cent. horse-blood agar. Hæmolytic streptococci were further identified by slide agglutination with type-specific antisera kindly supplied by Dr. F. Griffith. The following types were isolated in pure culture: type III, type IV (twice), type XII, and type XIII. On two further occasions hæmolytic streptococci were recovered which were not agglutinated by any of the type-specific antisera, although 1 of these cultures yielded an extract which gave a precipitate when tested with a group A (Lancefield) antiserum. The remaining "untypable" hæmolytic streptococcus did not correspond to group A, B, or C. Serological matches for the streptococci from the blood were found in cultures taken from the appropriate tonsils after removal in 4 of the 6 cases in which *Str. pyogenes* was isolated from the blood-cultures. In only 1 instance was there a failure to recover hæmolytic streptococci from the tonsil when such bacteria had been found in the blood after operation.

Of the non-hæmolytic streptococci, 2 cultures were bile-soluble and corresponded culturally and morphologically to *Str. pneumoniæ*. One belonged to type III but was not pathogenic for a mouse in a dose of 0·5 c.cm. of an eighteen-hour broth culture. The other did not correspond to type I, II, or III. The remaining non-hæmolytic streptococci were of the *Str. viridans* type.

Hæmophilus (6).—These organisms were identified by their morphological and cultural characters on simple nutrient agar, 5 per cent. horse-blood agar, and Fildes's agar. None grew unaided on simple nutrient agar, although 2 out of 4 cultures tested grew symbiotically with *Staph. albus* on this medium and apparently belonged to the "parahæmophilus" group. All the hæmophilic organisms isolated exhibited satellitism with *Staph. albus* on horse-blood agar, but none were hæmolytic.

Staphylococcus (5).—Of these organisms 3 were of the *albus*, 1 of the *aureus*, and 1 of the *citreus* type. None were hæmolytic for horse blood.

Corynebacterium (4).—All showed characteristic morphological and cultural characters on Löffler's medium. Two fermented glucose and sucrose; 2 fermented neither of these carbohydrates.

Bacillus (2).—The 2 aerobic spore-bearing organisms isolated from the blood were not investigated in detail.

The isolation of staphylococci, diphtheroids, and spore-bearing aerobic bacilli, organisms commonly found on the surface of the skin, is possibly to be ascribed, in some cases, to contamination.

PYREXIA FOLLOWING TONSILLECTOMY

In most of the patients who underwent tonsillectomy during the morning the temperature rose to 99°–100° F. by the evening but had fallen again to the pre-operative level twenty-four hours later. The occurrence and degree of pyrexia was not found to bear any obvious relationship to the existence of a demonstrable bacteriæmia or to the presence of any particular kind of organism in the blood-stream after operation. The blood was not examined for bacteria during the pyrexial period, but a similar rise in temperature had been observed in patients after dental extractions, when samples of blood taken at this time—i.e., four to nine hours after operation—had always proved to be sterile.

BLOOD-CULTURES BEFORE TONSILLECTOMY

In 64 out of the 100 cases in which the blood was examined after operation a sample of blood was taken for culture immediately before tonsillectomy. A similar sample was taken before operation in 18 cases from which no blood could be obtained after tonsillectomy. Of these 82 blood-cultures before operation 7 (8·5 per cent.) were positive, *Str. viridans* being recovered twice, *Staph. albus*, *Sarcina lutea*, *Bacillus subtilis*, a diphtheroid, and a mould once each. In 3 of these 7 cases a positive blood-culture was also obtained immediately after operation, but the organism isolated from the second was always different from that recovered from the first sample, except once when *Str. viridans* was obtained from the blood taken both before and after tonsillectomy. Apart from this case, it seems probable that the

* Liquoid is the proprietary name given to this compound by its manufacturers, Roche Products Ltd.

isolation of bacteria from the blood taken before operation was due to contamination, for the same organisms were not found in the postoperative sample, whereas those isolated from the preoperative specimen were types commonly found on the surface of the skin.

Comparison of different blood-culture media.—Each sample of blood was distributed equally between sodium citrate, saponin-citrate, liquoid, or saponin-liquoid broth, and the results are shown in table II. Two samples of blood are omitted from

TABLE II—ISOLATION OF BACTERIA FROM DIFFERENT BLOOD-CULTURE MEDIA USED IN PARALLEL

Samples of blood—		Growth in—			
Cultured	Containing bacteria which grew on culture	Citrate broth	Saponin-citrate broth	Liquoid broth	Saponin-liquoid broth
52	7	4 times	4 times	Not used	Not used
36	8	Not used	5 „	4 times	„
106	29	„	14 „	12 „	15 times

consideration in table II, for they were inoculated only into saponin-citrate broth; both cultures were positive. There was no evidence for the enhanced growth of any particular type of organism by any particular type of broth medium, except possibly saponin-citrate broth, from which hæmolytic streptococci were recovered 5 times, as compared with 1 occasion on which they were recovered from liquoid broth in 5 blood-cultures when both media were used in parallel.

CULTURES FROM TONSILS

In 137 cases cultures were made on 5 per cent. horse-blood agar from the surface and crypts of the tonsils after their removal. A sterile platinum loop was roughly passed over the surface and introduced into the crypts of each tonsil and then rubbed over the surface of a blood-agar plate. Hæmolytic streptococci were isolated from 87 cases (64 per cent.), being present in profuse culture in 54. From 44 unselected cases in which the tonsillar cultures yielded a growth of hæmolytic streptococci an attempt

TABLE III—HÆMOLYTIC STREPTOCOCCI ISOLATED FROM TONSILS IN 44 CASES

Type (Griffith)	Recovered from tonsils in—	Type (Griffith)	Recovered from tonsils in—	Type (Griffith)	Recovered from tonsils in—	Type (Griffith)	Recovered from tonsils in—
	Cases		Cases		Cases		Cases
I	3	VI	2	XIV	8	XXII	1
II	2	XI	1	XV	1	XXV	3
III	4	XII	2	XVI	1	XXVIII	4
IV	3	XIII	4	XX	1	Ut.	4

Ut. = untyped.

was made to identify these organisms by the slide-agglutination method. In 38 cases (86 per cent.) the streptococci corresponded to serological types found in group A (Lancefield), in 1 case to a type in group C, and in 1 to a type in group G. Of the remaining 4 cultures of hæmolytic streptococci 1 belonged to group A but could not be typed with certainty, and 3 cultures could not be typed and were not grouped (see table III).

DISCUSSION

A fair body of evidence has now accumulated pointing to the conclusion that transient bacterial invasion of the blood-stream is a not infrequent occurrence usually unattended by serious consequences. This had appeared evident from the results of animal experiments and observations summarised by Haines (1937). Nocard drew attention to the fact that the serum of fasting horses was nearly always sterile whereas that of animals recently fed often contained bacteria. Desoubry and Porcher (1895) confirmed this in the case of dogs, and Griffith (1907), using a different technique, obtained similar results with calves and pigs. Fatigue and starvation are also factors which, in experimental animals, appear to facilitate the passage of organisms from the alimentary tract into the blood-stream (Ficker 1905, Boycott and Price-Jones 1926, Cobbett and Graham Smith's unpublished observations). In man a condition of "subinfection" was postulated by Adami (1910), who contended that under normal conditions bacteria are carried in the blood-stream and lymphatics from the intestine to the liver and mesenteric lymph-nodes. In conditions of "chronic intestinal irritation," he said, that the normally occurring bacteriæmia is increased and the bacteria are visible as "abundant minute granules" in the liver-cells and mesenteric glands. Lewis and Grant (1923) have brought forward evidence of a different nature suggesting an "almost physiological entry" of organisms into the blood-stream of the average person.

Tissue injury in infected areas has long been established as the cause of transient bacterial invasions of the blood-stream. The observations of Seifert (1925) on a large series of cases subjected to operation, re-examination of wounds, or the changing of dressings in an infected area clearly demonstrated this. Similar evidence was brought forward by Barrington and Wright (1930), who made blood-cultures from patients in whom there had been some manipulation in an infected urinary tract, and Lehmann (1926) recovered *Cl. welchii* from blood-cultures made immediately after curettage in 18 out of 100 consecutive abortions. Operations in an area so heavily infected as the mouth would be expected to lead to bacterial showers in the blood-stream, and these have been demonstrated in many patients immediately after the extraction of teeth, especially in the presence of severe gingival infection (Okell and Elliott 1935, Fish and Maclean 1936, Round, Kirkpatrick, and Hails 1936, Southworth and Flake 1938, and Bulleid's unpublished observations). Furthermore, it has been shown that a minimal degree of tissue damage, such as is produced by the slight manipulation of a tooth in an infected socket (Elliott 1939) or by the chewing of hard sweets by a patient with infected gums (Round et al. 1936), will induce immediate though transient invasion of the blood-stream, nearly always by streptococci of the *viridans* type. From these observations it seems fair to conclude that an almost constant "seepage" of organisms into the blood-stream takes place from heavily infected tissue, such as the gums, which, in pyorrhœa, are constantly submitted to mild degrees of trauma similar to that caused by the movement of a loose tooth in an infected socket.

It is not surprising, therefore, to find that tonsillectomy is followed in a fair proportion of cases by a demonstrable bacteriæmia. The incidence of bacteriæmia after removal of tonsils appears to be about the same as after extraction of teeth in a "clean"

mouth (34 per cent.) but considerably less than after extraction of teeth in pyorrhœa (76 per cent.). On the other hand, the diversity of bacteria in the blood seems to be greater after tonsillectomy than after dental extraction, when non-hæmolytic streptococci are found almost exclusively. This may be correlated with the great variety of the bacterial flora of the tonsil as compared with that of the gums, where *Str. viridans* is almost always the predominating organism.

From time to time cases are recorded in which subacute bacterial endocarditis appears to follow tonsillectomy; instances have also been described of recrudescence of acute rheumatism or of acute nephritis after this operation. The foregoing observations indicate a possible source and mode of infection in such cases. It is of interest that occasionally the causal organism in subacute infective endocarditis is of the hæmophilus or parahæmophilus group (Miles and Gray 1938), and that those organisms may be found in the blood after tonsillectomy. Of equal interest is the observation that pathogenic organisms such as *Str. pyogenes* may circulate in the blood for short periods and in small numbers without producing any observable ill effect.

The results of the tonsillar cultures here recorded suggest that some 60 per cent. of patients admitted to hospital for tonsillectomy carry *Str. pyogenes* in the throat. This is not altogether surprising, for it must be borne in mind that most of these patients had diseased tonsils, although it was not customary to admit cases for tonsillectomy within six weeks of an attack of tonsillitis. These observations are, therefore, not comparable with those of Hare (1935), who found *Str. pyogenes* in 7 per cent. of throat and nose swabs taken from normal subjects. A carrier-rate of about 60 per cent., however, among patients admitted to hospital for tonsillectomy emphasises the risk in otorhinological wards of streptococcal cross-infection, which a previous inquiry has indicated as happening not infrequently in the absence of special preventive measures (Okell and Elliott 1936).

SUMMARY

(1) A transient bacteriæmia has been observed in 38 out of 100 patients within a few minutes of tonsillectomy. (2) Bacteria were found in the blood regardless of whether the tonsils were removed by blunt guillotine or dissection. (3) The organisms isolated included *Str. pyogenes*, *Str. viridans*, *Str. pneumoniæ*, *Hæmophilus influenzæ*, staphylococcus, and corynebacterium. (4) Serological matches for *Str. pyogenes* recovered from the blood were isolated from the corresponding tonsils after their removal. (5) Hæmolytic streptococci were recovered from the tonsils of 87 out of 137 patients undergoing tonsillectomy (64 per cent.). (6) Of 44 cultures of streptococci so isolated and examined serologically 39 (86 per cent.) belonged to group A, 1 to group B, and 1 to group C (Lancefield). (7) The evidence for the common occurrence of transient bacteriæmias in man and animals and the possible bearing of these observations on the ætiology of subacute infective endocarditis are briefly discussed.

The preparation of this paper owed much to encouragement and advice from the late Prof. C. C. Okell. My thanks are due to Mr. Alfred Walford, hon. surgeon to Addenbrooke's Hospital, Cambridge, for access to cases under his care, and to Dr. F. Griffith, of the Ministry of Health, for the use of type-specific streptococcal antisera. The work was carried out during the tenure of a grant from the Harmsworth Memorial Fund.

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PRODUCTION AND PREVENTION OF CARDIAC MURAL THROMBOSIS IN DOGS

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IN a previous communication (Solandt and Best 1938) the use of heparin in the prevention of experimental coronary thrombosis in dogs was described. It was recognised that, owing to the indefinite nature of the premonitory signs of coronary thrombosis in man, this procedure would have limited value as a means of preventing the thrombosis. However, if administered after the thrombosis had occurred it would presumably inhibit the extension of the thrombus and it might prevent the formation of cardiac mural thrombi. As over 10 per cent. of the deaths from coronary thrombosis are caused by embolic sequelæ to mural thrombus formation, this latter possibility seemed worthy of investigation.

The first objective of the present experiments was therefore to obtain, with absolute certainty, mural thrombus formation on a necrotic area. The second was to prevent such thrombus formation with heparin.

METHODS

Dogs weighing 5–15 kg. were used as the experimental animals. The tip of the left ventricle was chosen as a region of the heart favourable for the formation of large thrombi. It is a site from which the blood-stream will have no great tendency to dislodge a thrombus, especially if the myocardium at the tip is rendered inactive.

In previous studies on coronary occlusion it was found that simply tying the coronary vessels supplying the tip of the left ventricle did not, in over 100

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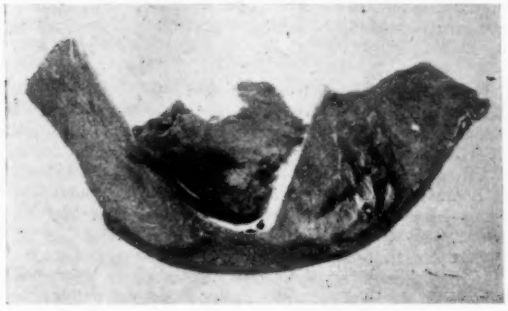

FIG. 1A—Section (× 2·3) of the tip of the left ventricle 24 hours after injury showing a large adherent mural thrombosis. No heparin was administered.

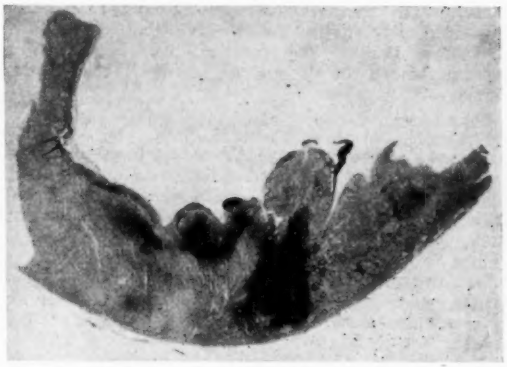

FIG. 1B—Section (× 2·3) of the tip of the left ventricle 24 hours after injury showing extensive myocardial and endocardial damage but absence of mural thrombi. Heparin was administered as noted in the accompanying table.

animals, result in the formation of a macroscopic or microscopic mural thrombus. The technique finally evolved to bring about thrombus production was to tie the descending branch of the left coronary artery and then infiltrate the myocardium at the tip with 2 c.cm. of 5 per cent. sodium ricinoleate (Soricin). This solution was introduced through a fine (No. 32) hypodermic needle and an attempt was made to deposit the solution in the muscle immediately adjacent to the endocardium. About eight 0·25 c.cm. injections, covering an area 1–2 cm. in diameter, were usually made. On a number of occasions less drastic injury gave thrombus formation; but certainty of formation rather than minimal injury was our objective. It seems reasonable to suppose that, once agglutinating platelets have covered an injured region, the nature or degree of the underlying tissue damage will have little or nothing to do with subsequent growth of the thrombus. Thrombus formation may well be an all-or-nothing process.

Routine electrocardiograms were taken, using the chest lead (left-arm lead over the apex-beat at the

TABLE I—MURAL THROMBUS EXPERIMENTS
(1½ HR. CONTROL SERIES)

No heparin administered and animals autopsied 1½ hr. after hearts injected.

Dog no.	Ecg. R wave (in.)	Thrombus: (*a*) macroscopic; (*b*) microscopic	Dog no.	Ecg. R wave (in.)	Thrombus: (*a*) macroscopic; (*b*) microscopic
1–25	—	(*a*) Large mural thrombus (mixed and white) and clot; (*b*) large thrombus (mixed and white)	6–45	—	(*a*) Large mural thrombus (mixed and white) and clot; (*b*) large thrombus (mixed and white)
2–30	—		7–46	—	
3–33	—		8–48	—	
4–34	3/32		9–49	—	
5–43	—		10–50	—	

Ecg. = electrocardiogram

TABLE II—MURAL THROMBUS EXPERIMENTS
(1½ HR. HEPARIN SERIES)

Heparin administered—70 units per kg. given 3–5 min. before soricin injection and second similar dose approximately ½ hr. later except in no. 35 where only initial dose given. Animals autopsied 1½ hr. after hearts injected.

Dog no.	Ecg. R wave (in.)	Thrombus: (*a*) macroscopic; (*b*) microscopic	Dog no.	Ecg. R wave (in.)	Thrombus: (*a*) macroscopic; (*b*) microscopic
1–29	1/8	(*a*) No mural thrombus or clot; (*b*) small white thrombi	4–35	1/16	(*a*) No mural thrombus or clot; (*b*) no thrombus
			5–37	1/16	
			6–38	—	
2–31	—	(*a*) As above; (*b*) no thrombus	7–39	—	
			8–40	1/2	
3–32	—	(*a*) As above; (*b*) small white thrombi	9–41	1/16	
			10–44	—	

TABLE III—MURAL THROMBUS EXPERIMENTS
(24 HR. CONTROL SERIES)

No heparin administered and animals autopsied approximately 24 hr. after hearts injected.

Dog no.	Ecg. R wave (in.)	Thrombus: (*a*) macroscopic; (*b*) microscopic	Dog no.	Ecg. R wave (in.)	Thrombus: (*a*) macroscopic; (*b*) microscopic
1–12	—	(*a*) Large mural thrombus (mixed and white) and clot; (*b*) large thrombus (mixed and white)	6–17	—	(*a*) Medium mural thrombus (mixed and white) and clot; (*b*) large thrombus (mixed and white)
			7–18	—	
2–13	—	(*a*) Medium as above; (*b*) as above			
3–14	—				
4–15	—		8–20	—	(*a*) Large as above; (*b*) as above
			9–21	—	
5–16	—	(*a*) Large as above; (*b*) as above	10–22	1/32	

TABLE IV—MURAL THROMBUS EXPERIMENTS
(24 HR. HEPARIN SERIES)

Heparin administered—70 units per kg. given 3–5 min. before soricin injection and second similar dose approximately ½ hr. later (no second dose in nos. 66 and 67). Continuous intravenous of heparin at the rate of 40 u./kg./hr. started during this ½ hr. interval and continued until autopsy. Animals autopsied approximately 24 hr. after hearts injected.

Dog no.	Ecg. R wave	Shortest clotting-time observed	Thrombus: (*a*) macroscopic; (*b*) microscopic
1–51	—	1½ hr.	(*a*) No mural thrombus or clot; (*b*) no thrombus
2–52	—	1½ hr.	
3–53	—	Over 5 hr. (no early sample)	
4–55	—	1½ hr.	
5–61	Not done	Over 3½ hr. (no early sample)	
6–64	„	10 min.	
7–66	„	12 min.	
8–67	„	14 min.	

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5th–7th rib and right-arm lead over the costo-vertebral angle) previously investigated (Solandt and Best 1938). The resulting records furnished information on the site and degree of the myocardial damage.

RESULTS

Fig. 1A shows a mural thrombus formed in the left ventricle of a heart treated in the manner outlined above. Large pendulous thrombi were usually found 30 minutes after the injection of the sclerosing solution. Such thrombi were composed chiefly of platelets.

The results obtained from a series of animals on which the autopsies were performed 1½ hr. after the hearts were injected are summarised in table I. Macroscopic mural thrombi were present in every case.

It is worthy of note that, in the dog, any damage which prevents the contraction of the apical region

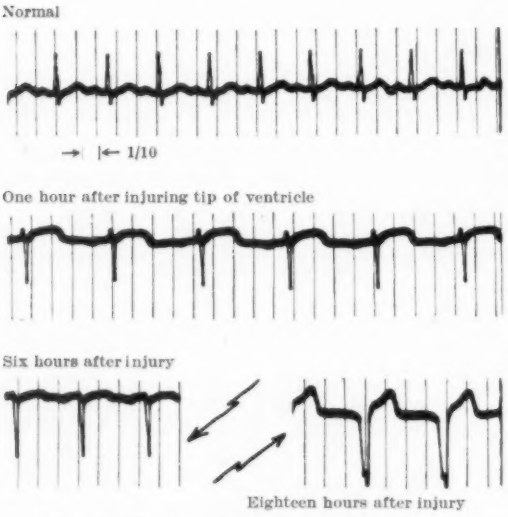

FIG. 2—Electrocardiogram of dog (chest lead).

of the left ventricular myocardium is almost always accompanied by a complete loss of the R wave of the electrocardiogram with the particular chest lead used. Fig. 2 shows the sequence of changes which culminate in this striking end-result. This confirms our previous observations (Solandt and Best 1938).

The results obtained on a series of animals treated as those in table I, except that heparin was administered as noted, are summarised in table II. A sterile and non-toxic solution containing 1000 units of heparin per c.cm., as supplied by the Connaught laboratories of the University of Toronto, was used in all our studies. No macroscopic thrombi were seen although microscopic clumps of platelets were present in many cases. The significance of this microscopic clumping will be discussed.

The results obtained from a series of animals on which the autopsies were performed 24 hours after the hearts were injected are summarised in table III. Again macroscopic mural thrombi were present in every case. A similar series which received heparin is described in table IV. Fig. 1B shows the tip of the left ventricle of the heart of an animal from this latter series. The damaged myocardium, necrotic endocardium and absence of mural thrombi are all very evident. No macroscopic or microscopic mural thrombi were found in this series.

DISCUSSION

It seems apparent from the foregoing results that, in the dog, heparin will prevent the formation of mural thrombi over grossly damaged endocardium. The damage produced was probably, in every case, much more severe than is ever seen in man as a result of occlusion of one or more coronary vessels. It seems reasonable to suppose, therefore, that heparin would prevent mural thrombus formation following a coronary thrombosis.

In the present experiments necrosis and thrombus formation started almost as soon as the sclerosing chemical was brought into contact with the myocardium. After coronary thrombosis it is probable that several days must elapse before necrosis becomes sufficiently severe to induce mural thrombus formation. Thus, in coronary thrombosis, one would expect to prevent the formation of a mural thrombus even if the administration of heparin was started some considerable time after the initial thrombosis. Just how long the heparin must be continued to permit a degree of healing such that further thrombosis will not occur when the heparin is discontinued is a matter which can be settled only by clinical trial. Murray, Jaques, Perrett and Best (1937) have shown that complete healing of the grossly damaged intimal layer of a vein takes place during heparin administration. It is reasonable to infer that the endocardium might undergo similar repair when thrombus formation over the injured area is prevented. To prove this point, however, a great many dogs would have to be sacrificed, since in animals which have undergone extensive operative procedures it is extremely difficult to prevent hæmorrhage from the cut surfaces when heparin is used.

A few of the hearts from the 1½ hr. heparin series showed microscopic clumps of platelets. These were never seen in the 24 hr. heparin series. In other experiments, not yet reported, we have evidence that the action of heparin on the agglutination of platelets takes longer to develop than does the effect on blood-clotting. In the 1½ hr. series the microscopic clumping of platelets could probably have been prevented by allowing a longer interval to elapse between the initial dose of heparin and the injection of the sclerosing solution. The clumps of platelets similar to those seen in this 1½ hr. series were probably also present early in the 24 hr. series. It is probable that they were washed away and were not replaced after the action of heparin on platelet agglutination had become fully established.

It has been suggested (*Brit. med. J.* 1938, Graybiel and White 1939) that heparin is contra-indicated in the prevention of coronary thrombosis where the initial vascular damage consists of a subintimal hæmorrhage as described by Paterson (1938) and Wartman (1938). Obviously this objection does not apply to the use of heparin in the prevention of formation of mural thrombi. In this case, as previously mentioned, the blood-clotting time need not be raised until some time after the thrombosis of the artery is complete; heparin has no effect on a thrombus already formed. However, we would like to take this opportunity to point out that the administration of heparin early in an attack of coronary thrombosis, even before the actual vascular thrombosis, is not necessarily contra-indicated in the light of the evidence at present available. It is not established that bleeding into a tissue space, such as the subintimal site mentioned, is stopped by blood-clotting. This

hæmorrhage is more probably checked by tissue pressure before clotting takes place, and the administration of heparin under such conditions should in no way extend or prolong the bleeding. Obviously, however, this point can only be settled when extended clinical trials with heparin have been made. We would like again to emphasise the fact that this objection to the use of heparin, even if valid, in no way involves its application in the prevention of mural thrombus formation.

SUMMARY

1. A method is described by which cardiac mural thrombi may be produced in animals. These thrombi form very rapidly.

2. This formation of mural thrombi may be completely prevented by the administration of adequate amounts of highly purified heparin.

3. Since over 10 per cent. of the deaths associated with coronary thrombosis in man are caused by embolic sequels of mural thrombus formation, a clinical trial of heparin is indicated. It would be useful to discover, by clinical investigation, the duration of heparin administration necessary to permit endocardial healing sufficient to ensure freedom from subsequent thrombus formation.

It is a pleasure to thank Dr. D. L. MacLean for the histological work involved in these experiments. The technical assistance of Mr. C. R. Cowan has been invaluable.

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MONOCYTIC ANGINA

(GLANDULAR FEVER) TREATED WITH M. & B. 693

REPORT OF A CASE AND EXPERIMENTAL TRANSMISSION

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The history of the recognition of glandular fever and of the several clinical types to which this virus infection may give rise, together with the symptomatology and blood-picture of the disease have been very clearly described by Letheby Tidy. He mentions three types: (1) glandular, (2) anginose, and (3) febrile (which might also be called the exanthematous type), and points out that cases of mixed type may occur.

The case reported below belongs to the second group and is an example of the anginose type in pure form. These cases are comparatively rare and may give rise to considerable difficulty in diagnosis in their earlier stages.

CASE-RECORD

The patient was a girl, aged 18, with little in her past history of interest, except that she had always disliked sun-glare and was said to have suffered on two or three occasions from "a touch of sun," the symptoms having been headache and nausea, accompanied by fever lasting a few days.

On May 15, 1939, she went from London to stay in Paris. During the last few days of that month she found the heat and bright sunlight rather trying, and she felt unduly tired. On June 1 she felt definitely unwell and complained of headache and slight nausea. It was remarked that she looked ill. She consulted a doctor in Paris, who diagnosed *un coup de soleil*. She returned to London on June 3, her symptoms then consisting of fairly severe headache, an intense dislike of daylight, obstinate constipation, and feverishness.

The patient first came under observation on June 7, the seventh day of her illness. She lay in a completely darkened room and complained of intense headache but had no true photophobia; she was irritable and rather resentful of examination; the temperature was 102° F., pulse-rate 108, and respiration-rate 22. The face appeared rather puffy, especially about the eyes, the cheeks were flushed and the conjunctivæ slightly suffused. The tongue was moist and but thinly coated. The bowels had been opened the previous day with senna. Detailed examination did not elicit any other signs. Fundi oculorum normal; no signs referable to the central nervous system; the respiratory and cardiovascular systems were normal; the throat appeared healthy; there was no glandular enlargement or any evidence of enlargement of the liver or spleen; the kidneys were not palpable; nor was any departure from normal detected elsewhere in the abdomen; the urine contained no abnormal constituents.

On June 9 serum reactions for *Bacillus typhosus* "H" and "O," *Bacillus paratyphosus* A "H," *Bacillus paratyphosus* B "H" and "O," and *Brucella abortus* proved negative. A rapid examination of a blood-smear revealed nothing of interest.

Between the 7th and the 12th, in spite of the continued pyrexia, the patient appeared remarkably well, the tongue remained almost clean, the headache was less severe, and the dislike of the light had passed; no fresh signs or symptoms had appeared. On the 12th a mildly irritable cough developed, and on the following day complaint was made of soreness of the throat and stuffiness of the nose; the fauces appeared red on examination.

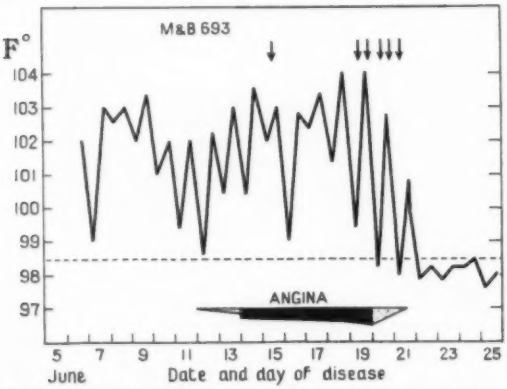
By June 14 (the fourteenth day of the disease) a rapid change had occurred; there was obvious swelling of the left side of the neck, and there was much œdema in the region of the left tonsil, which itself was much swollen, acutely inflamed, and covered by a diphtheritic-like membrane. The tonsillar lymphatic gland was much swollen and tender, swallowing almost impossible, nourishment refused, and rest greatly interfered with; the patient showed some degree of anxiety. The tongue was now thickly coated and the breath foul. Cultures and smears from the throat showed the presence of the pneumococcus, *Staphylococcus aureus*, *Micrococcus catarrhalis*, and spirochætes of the Vincent type. The temperature had reached over 103° F., but still the patient appeared comparatively well.

Further laboratory investigations carried out by Dr. H. Schwabacher proved the blood and urine to be sterile on culture. Serum reactions as above were repeated and again proved negative. The following morning the local condition in the throat was worse, and the spleen was palpable. This completed the clinical picture of the anginose type of glandular fever, confirmed by the report on blood examination received the following day: red blood-cells 4,600,000; hæmoglobin 91 per cent.; colour-index 0·9; halometer reading normal; white cells 16,200; polymorphs 30 per cent., with a slight shift to the left; monocytes 66 per cent. The Wassermann reaction was negative.

Further confirmation of the diagnosis was made on the 17th, when the Paul-Bunnell reaction (blood taken on the 14th) was returned as positive; lysis occurred in 1 in 640 dilution.

Treatment.—At midday on the 15th an attempt was made to give M. & B. 693 by mouth, but the vomiting resulting from the administration of one tablet (0·5 g.) was so severe that administration of the drug had to be discontinued. Four days later, on the 19th, when the temperature had reached 104° F., and the condition of the patient was at its

worst, a second attempt was made, on this occasion by intramuscular injection. At 4 P.M. 0·5 g. of M. & B. 693 in oily emulsion was given into the buttock and at 10 P.M. 1 g. of the water-soluble sodium preparation into the other buttock. The temperature fell from 104° to 98° F. The following day (20th) the temperature rose to 102·8° F. in the evening; on that day two injections of the soluble salt, each of 1 g., were given into the gluteal muscles, at 12 noon and 9.30 P.M. The temperature fell to



Temperature chart. At the first arrow the drug was given by mouth and at the following arrows intramuscularly.

98° F. On the 21st a fifth injection was given at 10.30 A.M. The temperature that afternoon only reached 100·8° F., to fall again on the morning of the 22nd and remain normal thereafter (see chart).

Very soon after the first injection cough became more pronounced, and a good deal of foul sputum, consisting of the products of disintegration of the tonsillar exudate, was coughed up. In a bout of coughing during the second injection at 10 P.M. and again on the evening of the next day the sputum was freely bloodstained. After the lapse of three days from the beginning of treatment the faucial condition had practically cleared up, and the patient could once more take nourishment freely and slept peacefully the night through, the first time for three weeks.

DISCUSSION

This case illustrates very well the clinical course of a case of glandular fever of the anginose type in uncomplicated form: a prodromal period of ten days (seven to fourteen) with headache and progressively rising temperature, obstinate constipation, but no other signs, and relatively mild constitutional disturbance followed by the complaint of sore-throat and then the extremely rapid development of an acute membranous angina with faucial œdema and swelling of the neck towards the end of the third week, splenic enlargement but no exanthem and no enlargement of superficial lymphatic glands or signs of involvement of the mediastinal or mesenteric glands. This forms a characteristic and diagnostic syndrome, the blood formula is pathognomonic, and the Paul-Bunnell test depending on the development of heterophil antibodies in the patient's serum may now be relied on as proof of the infection.

As far as we are aware, this is the first case of monocytic angina to be treated with M. & B. 693. Obviously it would be unwise to argue from a single observation, but the rapidity and the manner of the apparent response to treatment are very suggestive of a specific action of the drug in this infection. The mode of fall of the temperature and the rapid resolution of the angina (which untreated may persist for a very much longer time), together with the rapid establishment of convalescence, were most striking. On the other hand, the action of the drug may have been solely upon secondary organisms.

EXPERIMENTAL TRANSMISSION

Blood removed on the nineteenth day of illness was cultured aerobically and anaerobically on the more commonly employed bacteriological media and yielded no growth. The culture medium, rich in serum, used for the isolation of pleuropneumonia-like organisms also showed no growth.

In recent years evidence has been accumulating that infectious mononucleosis is due to a filtrable organism.

Bland (1931a and b) injected blood, taken during the febrile stage of infectious mononucleosis, into rabbits and produced a fatal infection. Heart blood, obtained from the rabbits, injected into rhesus monkeys caused fever, general lymphadenitis, enlargement of the liver and spleen, and a mononucleosis with primitive lymphocytes. Although Bland's experiments were complicated by the presence of a toxoplasma, he certainly succeeded in causing in monkeys a syndrome similar to that seen in human beings.

Later, van den Bergh and Liessens (1939) and Wising (1939) produced an infection in the rhesus monkey. Van den Bergh and Liessens injected a rhesus monkey intramuscularly with blood taken on the fourth day of illness. For the first three weeks the differential leucocyte-count showed little change, the percentage of large mononuclears being between 0·5 and 2·5. On the twenty-fourth day the large mononuclears were 13·5 per cent., on the twenty-fifth day 21·5 per cent., and on the twenty-sixth day 12 per cent. There was no febrile reaction and no definite enlargement of the lymph-nodes. The infection could be passaged in series, and the infective agent was filtrable through a Seitz pad. Wising (1939) also reported an increase in the number of mononuclear cells, together with adenitis and slight fever. During the course of the experiments a laboratory assistant was accidentally contaminated with blood from an infected monkey and after about seven days developed symptoms highly suggestive of infectious mononucleosis.

In the present investigation 4 c.cm. of whole blood from the patient was injected intramuscularly into a rhesus monkey. Daily differential blood-counts were made. The number of large mononuclear leucocytes varied from 1·5 to 4 per cent. for the first twelve days after injection. Then on the thirteenth day after infection the number rose to 7 per cent. and on the fifteenth day to 28 per cent., falling on the sixteenth day to 12 per cent. and remaining between 15 and 20 per cent. till the twenty-first day after inoculation. Blood-cultures taken from the monkey at the height of the mononuclear leucocytosis remained sterile. The monkey at no time showed a temperature reaching 104° F., although the lymph-nodes in the axilla were a little more easily palpable during the period of reaction.

Blood from the patient, inoculated intracerebrally into mice, caused no evidence of illness, and no toxoplasmata were seen in smears from their tissues.

Confirmatory evidence has thus been obtained that infectious mononucleosis is transmissible to the rhesus monkey. Further observations are being made, especially on the action of chemotherapeutic drugs.

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CLINICAL NOTES

TREATMENT OF SPRAINS BY INJECTION OF PROCAINE

By E. L. Frankel, M.B. Lond.
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A sprain is defined as a temporary subluxation in which the articular surfaces have returned to their normal positions and in which some damage has been done to the ligaments, tendons or muscles around the joint. The ligaments are most commonly affected. This structure may be completely torn across or it may be avulsed from its attachment, when an extravasation of blood into the surrounding tissues can be observed; or in less severe injuries there may only be a partial tearing or stretching of the ligament, soon followed by œdematous swelling of the damaged tissues.

The injury is always accompanied by intense pain, which may be localised to the site of the lesion or spread to involve the neighbouring parts. According to Prof. René Leriche an anatomically slight injury to the very sensitive nerve-endings in the neighbourhood of joints starts a reflex, which begins with centripetal impulses from joint to central nervous system. A vasomotor response follows, with local œdema and rise of temperature, pain and limitation of movement. The disturbance of the local vasomotor equilibrium gives rise to continued impulses and a vicious circle is thus established.

The treatment of sprains used to be most unsatisfactory. Once fracture was excluded by radiography the treatment in hospital practice was usually left to the nurse or dresser who applied a tight bandage to the joint over some lint soaked in some cooling lotion, or the joint was strapped with adhesive bandage. The rest of the treatment was left to the physiotherapy and massage department. Though sprains are only minor injuries they may give rise to prolonged discomfort and invalidism and the average sprain in an adult, treated in this way, requires 2–4 weeks to heal.

The recent treatment of sprains by injection of procaine into the injured ligaments is, as far as can be judged at this stage, a definite advance on the old treatment. The centripetal impulses are cut off and abolished by the action of the local anæsthetic. Thus the local vasomotor response is diminished or prevented altogether and somehow does not appear to reoccur to any marked extent, even after the action of procaine has worn off. Future work must show whether this theory is really in accordance with physiological facts.

Technique.—The ligaments of joints that are most commonly sprained are easily accessible. The skin over the sprain is carefully cleaned with methylated ether. It is now a matter of palpation to find for injection the most tender point. This is marked and the injection made through it down to the ligament. The strength of the solution of procaine is 2 per cent. and 3 to 5 c.cm. are usually sufficient for a minor and 5–10 c.cm. for a more severe sprain. The fluid is injected in various directions. Thus the whole affected area is infiltrated. After injection the part is lightly massaged, thus distributing the procaine evenly throughout the tissues. With sterilised instruments and solution there is no risk of sepsis, and an accidental intravenous injection can be avoided by the usual precautions. Injection may have to be repeated on the second or third day if the result after the first injection should not be satisfactory.

A total of 20 cases of sprains has been treated, the patients' ages ranging from 11 to 65. They were allocated as follows: radial collateral, 2; dorsal radiocarpal, 3; volar radiocarpal, 1; ulnar collateral, 1; anterior talofibular, 8; calcaneofibular, 3; tibial collateral, 1; dorsal first metatarsophalangeal, 1. The average amount of procaine injected varied between 3 and 10 c.cm. Pain disappeared at once in 15 cases and was much relieved in 5 cases. It did not return in 7 cases, recurring after one hour in 1 case; after 2 hours in 1 case; after three hours in 3 cases; after four hours in 1 case; after five hours in 1 case; and after six hours in 6 cases. In only 2 cases was it necessary to give a second injection after twenty-four hours.

The effect of this treatment is dramatic. All the signs and symptoms of a severe sprain may disappear in a few moments after procaine has been injected into the ligament of the joint involved. If, for example, a sprain of the ankle is promptly treated, œdema, local heat, pain, tenderness and almost complete loss of function will quickly vanish and the patient will be able to walk home. It is of advantage to inject the sprained part soon after the injury occurs, but also old sprains have been successfully treated in this way. Pain usually returns 3–6 hours after injection. It varies in intensity, and is usually less than the initial pain, though a few patients complained of more severe pain. It then gradually passes off and completely disappears after 24–48 hours. A slight ache and feeling of weakness in the joint may be noticed for 1–4 days after the accident. After injection the joint is firmly strapped with Elastoplast and the patient instructed to use the limb carefully. Exercise is better avoided for several days so that the patient may regain his sense of security and also to prevent a recurrence of the sprain. This treatment has been successfully employed for sprains of the ankle- and wrist-joints, which are the sprains most commonly encountered. Sprains of the knee-joint and the smaller joints of the hand and foot have equally benefited by it and the results have generally been good and quite uniform with regard to recurrence of pain and final cure.

SKIN GRAFTS IN THE CASUALTY DEPARTMENT

By D. N. Matthews, M.Ch. Camb., F.R.C.S.
SURGICAL REGISTRAR AT WESTMINSTER HOSPITAL

Every surgeon who has had charge of a hospital casualty department will remember patients brought to the hospital as a result of some accident in which an area of skin and fat had been lost, and will also remember that these patients had to tolerate painful dressings for many weeks before the wounds healed by granulation. This note is to suggest a method by which both the pain and the waste of time can be avoided and a much better cosmetic result be produced than by allowing healing to take place by granulation.

The cutting of a thin Thiersch graft and its application to the raw area will produce a healed wound after five days with no infection and no scarring, provided that the wound is not grossly infected when first seen, in which case it must of course be treated on the usual lines. There are many wounds, however, which, although they are not technically

sterile, are quite clean enough to allow perfect healing of a graft applied to a raw area. To advocate the grafting of a raw surface is, of course, to suggest nothing new, but I believe that to emphasise the simplicity of the procedure under local anæsthesia together with the fact that the patient is treated entirely as an outpatient will draw attention to a method of treatment which is sadly neglected.

The technique is simple and the rules are few, but it is important to realise that they must be obeyed with meticulous care if success is to be obtained. The wound must be grafted as soon as it is seen and not allowed to wait until it becomes infected. Any temporary dressing, with which it may be necessary to cover the wound during the journey to hospital must consist only of sterile gauze soaked in saline, and under no circumstances must chemical antiseptics be used.

Forearm of a child, showing two healed areas on which a Thiersch graft had been applied five days before.

The figure shows two areas on the volar aspect of a child's forearm soundly healed five days after the application of a Thiersch graft to a wound caused by broken glass. The patient attended hospital a few hours after the injury and was grafted at once; the outer side of the right thigh was sterilised with spirit and an area large enough to cover the defect was blocked by the subcutaneous injection of 2 per cent. procaine. It is important to put the procaine under the skin and not into it, since intradermal injection makes the cutting of a graft almost impossible. The area should then be rubbed in order to spread the local anæsthetic evenly under the skin, and about five minutes allowed for it to take effect, after which the graft may be cut with any skin knife. Until a little experience has been gained in the "feel" of the skin after the injection of local anæsthetic the surgeon tends to cut a graft which is thin and ragged, so that it is as well to hold the knife as though a thick graft were required, when it will be found that the blade does not sink through the skin but merely cuts an epithelial layer of average thickness.

The graft is fixed by marginal sutures to the raw area and both the donor and recipient areas are covered with a greasy Vaseline dressing (Tulle Gras is the best) backed up by swabs soaked in normal saline, the whole being firmly held in position by elastic plaster bandages. It is as well to immobilise the grafted area, and in the case here illustrated this was effected by a plaster slab and a sling, but it is quite unnecessary to rest the leg and the patient is able to walk home without experiencing any pain. The dressings must be left untouched for five days, after which they are removed, when it is found that the donor area (leg) is quite healed and that the grafted area needs only the removal of the marginal sutures and the renewal of the greasy dressing for a further week.

As is always the case, this patient experienced no pain in the raw area as soon as it had been covered with the graft, and the injury was at once reduced to a mere inconvenience, in that the patient had to have her arm in a sling for a week. I have used this method for a wound on the dorsum of the foot when the patient walked out of hospital as soon as the graft had been fixed in position, and have found a perfect graft when the dressing was removed five days later, in spite of the fact that there must have been some slight movement of the two surfaces when walking. A final recommendation for this method of treatment is the excellence of the cosmetic result, which is much better than can ever be obtained by allowing granulation to take place. The graft requires about three months in which to take on the colour and texture of the surrounding skin, after which it will be found to be hardly visible.

A NEW FILTER FOR BLOOD-TRANSFUSION

By Montague Maizels, M.D. Lond., M.R.C.P.
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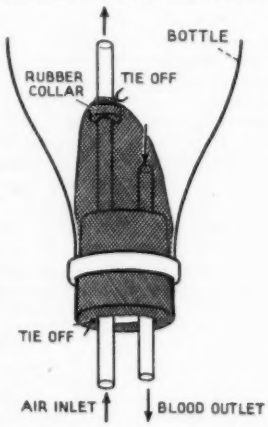
When blood has been kept for a few days after collection, it is usual to filter it through glass wool or McCartney beads before transfusion. In my view glass wool is unsatisfactory. It is unpleasant material to work with, for it is liable to scarify the skin and to fragment easily, so that technicians preparing hundreds of such filters a day would be wise to wear gloves and a mask. Packing the wool in the filter bulb requires considerable skill; if too loose or too tight, it is worse than useless. The glass-wool filter is not easy to clean, especially if left for some time after use, and the removal of old glass wool and its replacement by fresh is a finicking procedure. The filter is efficient for blood which is fresh or only two or three days old, but it is liable to clog with tacky gelatinous material when used for blood that has been standing for a longer time.

On the other hand gas-mantle fabric (before impregnation with incandescent salts and collodion) provides an efficient filter which may be used as an alternative to the glass beads or to replace the glass-wool filter.

The untreated gas-mantle of commerce consists of a knitted cotton tube with a purse-string tie-off at each end. It may be used as a filter in three ways:—



(1) A common method of transfusion is to collect blood in a bottle containing sodium-citrate solution, and to fit the vessel with a rubber bung pierced by a long air-inlet tube and a short blood-outflow tube. The bottle is inverted and the blood is led into the vein of the recipient through a rubber tube and needle.

To fit the mantle-filter a collar of narrow-bore rubber pressure-tubing is placed over the long air-inlet tube which it grips tightly. The mantle is drawn over the bung and its tubes and one of its purse-strings is tied above the pressure-tube collar. The purse-string at the other end of the mantle is drawn tight under the bung around the emergent glass tubes. The outfit may now be autoclaved.

The bung is then rammed into the neck of the bottle (see figure).

(2) If the mantle is shorter, its lower purse-string may be drawn tight over the upper end of the bung.

(3) Another common method of administering blood is to pour it into a cylindrical funnel, filtering it through a few layers of gauze awkwardly stuffed into the mouth of the funnel. It is simpler to place a large mantle inside the funnel, turn the upper edge of the mantle over the upper rim of the funnel, and tie off the purse-string just below the rim so as to hold the mantle in place.

For method (1), mantles should be 3 in. long by 1½ in. wide (flat); for method (2), 1½ in. by 1½ in.; and for method (3), 8 in. long by 3 in. wide. They may be obtained from William Still and Sons, 29 Greville Street, E.C.1, for a few pence.

MEDICAL SOCIETIES

BRITISH MEDICAL ASSOCIATION

SECTION OF SURGERY

WITH Prof. J. R. LEARMONTH (Aberdeen) in the chair, this section discussed

Treatment of Intractable Pain

Mr. NORMAN DOTT (Edinburgh) said pain was an indefinable term. It was the reaction to a stimulus, but the strength of the reaction did not indicate the nature or severity of the stimulus. It was the experience of bodily harm, and had its own anatomical pathway through the lateral nucleus of the optic thalamus. Pain had two elements, affective and cognitive. The affective element consisted of distress and fear and was experienced in the cerebral nuclei. The cognitive element consisted of appreciation of localisation, temperature and area of contact; these were experienced in the cerebral cortex. Pain was largely a protective physiological mechanism, for example against overdistension of viscera, but there were severe pains, such as headache and the pain of malignant disease, which were noxious without physiological reason. These were the intractable pains. Here the cause was either unknown or could not be removed. In persistent pain, the thalamic centre which tended to prevent impulses reaching the cortex became exhausted. The pain was produced in two ways. First an abnormal stimulus itself caused the pain, as in the contraction of scar tissue, and the involvement of nerve-endings in malignant disease. Secondly, an innocent stimulus, such as touch or heat, might be perverted or augmented to feel like severe pain. This was usually an axon reflex, as in causalgia. Occasionally a central lesion augmented or deranged stimuli; the most frequent cause was gliosis following trauma, disseminated sclerosis, syringomyelia, or tumour. Patients with these conditions were all susceptible to barometric changes. Augmentation depended on four factors: (*a*) *perversion*, when other forms of sensation such as cold or touch were perverted into the pain pathway, (*b*) *undue radiation*, when leakage of impulses occurred at the synapses; (*c*) *hypersensitivity*, when the inhibitory mechanism of the cortico-thalamic region was out of action; and (*d*) *epileptiform facilitation* of the pain-conducting system, paroxysmal or intermittent with only slight cause.

Pain was sometimes conditioned by the individual, and there was evidence to believe in psychogenic pain. Some viruses passed up along nerves and even across synapses, as in herpes zoster, leading to permanent damage with trophic and vasomotor changes. Trigeminal neuralgia was sometimes caused by inflammatory processes spreading from the accessory air sinuses. Pain was localised to the side of the lesion only as far as the thalamus. It was sometimes possible to infer the lesion from the type of pain felt. In central types, it was advisable to assess the pain after peripheral impulses had been blocked by local or spinal anæsthesia. If these relieved the pain, the treatment was obvious. In post-herpetic neuralgia, blocking of the gasserian ganglion relieved the hyperæsthesia and paroxysmal pain, but often left a dull central ache. Treatment of intractable pain was palliative. Pain impulses were blocked either above the causative lesion, or below the lesion, when the pain was relieved by abolishing the facilitating stimuli.

Mr. T. F. TODD (Manchester) described his experience in 82 cases of intractable pain, mostly caused by carcimona of the cervix. He considered pain was intractable when natural sleep was impossible. Visceral pain was relieved by presacral neurectomy, and somatic pain by intrathecal injection of absolute alcohol. Intrathecal injection was quite safe if one knew the technique. It was important to inject the alcohol slowly and limit the injection to not more than 1 c.cm. Occasionally it was followed by incontinence or retention, but this mattered less since all the cases treated were suffering from advanced malignant disease. In several cases the posterior columns had been examined and found to show degenerative changes following injection. The procedure was not recommended except for inoperable malignant disease.

Mr. J. B. OLDHAM (Liverpool) discussed pain of renal origin. It was a relatively common complaint, and renal sympathectomy showed no untoward effects. Intractable renal pain was probably due to spasmodic contraction of the smooth sphincteric muscle in the calyces and pelvis of the kidney, and there was possibly a vasospastic element. Renal sympathectomy produced a kidney which was insensitive to distension, and frequently the size of the renal pelvis decreased. He often combined the procedure with a plastic operation on the renal pelvis or nephropexy. Afterwards there was a secretion of larger quantities of more dilute urine. Pyelography was painless for about a year subsequent to the operation.

Mr. G. F. ROWBOTHAM (Manchester) spoke on the treatment of trigeminal neuralgia. The operations available were avulsion or injection into the three main branches of the nerve, alcohol injections into the second and third divisions, intracranial neurectomy of the three divisions, root-section in the middle cranial fossa approached extradurally, section by intradural approach through the posterior fossa, and lastly, intramedullary tractotomy. Section or block in front of the ganglion gave good results, but was sometimes followed by recurrence of pain after two years. Root section was precise in its localisation, and anæsthesia of the cornea could be avoided. In the extradural approach any facial paralysis was caused by damage of the greater superficial petrosal nerve and was transient. Approach through the posterior fossa was sometimes technically difficult. Tractotomy did not leave the face anæsthetic, but it

was a hazardous procedure and its only indication was in bilateral disease when keratitis had commenced in the other eye. As an anæsthetic he preferred basal narcosis combined with gas and oxygen. Probably the extradural fractional root-section through the middle fossa was the operation of choice.

Mr. D. W. C. NORTHFIELD (London) asked whether keratitis was more common following injection than operation, and Mr. ROWBOTHAM replied that in his experience keratitis occurred sometimes after all the procedures he had described, but he thought that it was more common after injection.

Prof. LAMBERT ROGERS (Cardiff) suggested that keratitis was less common if thyroid extract were administered following the operation. Dr. GERALD SLOT (London) thought that much of the pain in trigeminal neuralgia was of sympathetic origin. He had used paravertebral injections of novocain with effect and had used A.B.A. for injections of the trigeminal ganglion. Dr. P. W. R. PETRIE (Loanhead) spoke of the psychogenic causes of headache. Mr. NORMAN LAKE (London) discussed philosophy of pain. There was no complete explanation of pain, nor why trivial lesions might cause severe pain when more serious damage was sometimes symptomless. There were some pains which did not appear to have any physiological use. Some races were more sensitive to pain than others. He thought that at least part of this was early education to know and fear pain.

Dr. W. McK. CRAIG (Mayo Clinic) also spoke on psychogenic pain. He hoped that someone would discover a method of measuring the intensity of pain so that it would be possible to estimate the relation between psychogenic and organic pain before an operation had to be considered.

Mr. C. F. MAYNE (Plymouth) asked if any nerve section had been found to alleviate the severe pain in carcinoma of the pancreas. Prof. C. F. W. ILLINGWORTH (Glasgow) said that the pain in carcinoma of pancreas was readily explainable in terms of the numerous retroperitoneal nerves in that area. He quoted a case of pancreatic cyst where pain was completely relieved by the removal of the cyst.

Mr. NORMAN DOTT, summing up, agreed that pain could not be assessed scientifically. Loss of sleep was not enough. He had placed great reliance on the patient's own story. He did not think keratitis was more common after one type of operation than the other. Psychogenic pain did not enter into his scheme of life at all. He thought that visceral pain was largely protective. He himself had found it to be protective against the evil effects of Aberdonian hospitality.

Arteriovenous Fistula

Mr. A. M. RENNIE (Aberdeen), introduced by Mr. Norman Lake, described four cases of congenital arteriovenous fistula. It was due to abnormal patency of embryonic channels between arteries and veins. Normally a few of these channels persisted and aided in the temperature regulating mechanism of the limbs. Often they gave no symptoms until adolescence, but might be shown up by trauma. The fistulæ tended to be multiple. They produced nutritional changes in affected part, and cardiac changes similar to those of aortic incompetence. In all the cases he had seen the arteriovenous communication was in the lower limb, which was considerably hypertrophied and longer than the healthy limb. Section of an affected saphenous vein revealed that the vein wall had become arterialised. The venous blood on the affected side was found to be highly oxygenated, and the temperature was several degrees higher than on the healthy side. No proper explanation had been given for the hypertrophy of the limb. Owing to the possible dangers, arteriography had not been attempted. Treatment was unsatisfactory because of the multiplicity of communications. Ligature and injection had been used; amputation, though a last resort, was frequently followed by great relief of the cardiac symptoms.

Mr. NORMAN LAKE suggested that uroselectan might be used to outline the vessels, and Prof. LEARMONTH said that injection into an artery was an extremely painful procedure and to get a good picture it would have to be carried out rapidly.

Water Balance

Mr. D. C. L. BINGHAM (Edinburgh) said that, in giving water and saline an adequate volume of fluid must be administered daily, and dehydration must be prevented or corrected. In normal metabolism, about 800 to 1500 c.cm. of water was lost through the skin. This was frequently greatly increased in disease. The urine was normally about 1000 to 1500 c.cm. Therefore the body required between 2500 and 3500 c.cm. of fluid daily in health. It had been found convenient to give a patient 2500 c.cm. of fluid during the first twenty-four hours after operation, by intravenous infusion with 5 per cent. glucose in distilled water, and to measure the amount of urine passed. If the urine was less than 1000 c.cm., more fluid was needed.

He recommended the preoperative administration of 1000 c.cm. of physiological saline before operations on the gastrointestinal tract. All abnormal fluid losses, such as from biliary or intestinal fistulæ, should be made good.

SECTION OF MEDICINE

AT a meeting of this section, with Dr. A. GREIG ANDERSON (Aberdeen), the president, in the chair, a discussion on

Prophylatic Immunisation

against diphtheria, whooping-cough, measles, scarlet fever and influenza was opened by Sir JOHN LEDINGHAM (London). He said that of these diseases diphtheria clearly merits chief consideration; first, because of the great toll it takes of child life, and secondly, because it has been demonstrated beyond question, though so far in countries other than this, that active immunisation intelligently and persistently carried out has actually brought the morbidity from diphtheria in certain localities down to zero. These methods depend for their success far more on propaganda directed towards securing the immunisation of all pre-school children than on the particular immunising substance employed. He urged that the fact that experience of the performance of these antigens both in the laboratory and in the field has not yet resulted in complete unanimity as to the best possible type of antigen and the ideal method of administering it should not be allowed to hold up schemes for applying our present knowledge in practice.

The investigation of an antigen for prophylactic purposes comprises a study not only of its potency, tolerability and the like when administered in a single dose but also of the effect of multiple doses suitably spaced. Many elaborate studies of these antigens, in particular of formol-toxoid (F.T.), alum-precipitated toxoid (A.P.T.) and toxoid-antitoxin floccules (T.A.F.) are, he said, on record, and an analysis of the data seems to suggest that either three injections of F.T. and T.A.F., or two injections of A.P.T., at intervals of at least a month, would greatly reduce the

incidence of diphtheria amongst the immunised. Probably three doses of A.P.T. would be the most effective of all, or one dose of A.P.T. followed by two of F.T. or T.A.F. That the dose interval, and particularly the interval between the first and second doses, should be long rather than short, is a well-established finding in immunisation practice, whether in man, horse or guineapig. He emphasised that while the immunisation of school-children must be the first instalment of effort the ultimate objective should be the immunisation of the maximum number of children between the ages of 9 months and 2 years. When such immunised children enter school a reinforcing dose seems desirable. He said that suggestions likely to render immunisation against diphtheria more generally acceptable to parents and others responsible for the conservation of child life will be welcome, but he himself considered that some form of compulsion is the only remedy.

Sir John Ledingham pointed out that in England and Wales whooping-cough was responsible in 1937 for a death-rate of 0·04 per 1000, as against 0·07 for diphtheria, while the corresponding rates for measles and scarlet fever were 0·02 and 0·009. Influenza with its death-rate of 0·45 much exceeded these, and, although the prospects of influencing its morbidity and mortality by prophylactic measures are not at the moment very hopeful, he felt sure that efforts to explore still further the possibilities of active immunisation will continue. Immunisation against whooping-cough certainly demands further exploitation and here again we have to turn to other countries and especially the United States of America for relevant data. The results of some recent efforts strongly support the view that vaccines prepared from smooth organisms can confer a considerable degree of protection against pertussis. In this country combined studies by public-health officers and bacteriologists are much to be desired. The gradual enlightenment of the public, by repeated demonstrations in its midst, of the benefits that immunisation could confer on children exposed to diphtheria and whooping-cough would greatly facilitate progress. We might envisage the immunisation of children with a mixed vaccine of smooth pertussis organisms and diphtheria toxoid, in the light of Ramon's demonstration that the addition of T.A.B. vaccine to his diphtheria "anatoxine" in no way militates against the efficiency of either element.

Dr. D. W. BERRY (Aberdeen) reviewed the present position of the prophylaxis of scarlet fever. The usual method consists of the injection of diluted toxin subcutaneously five times at weekly intervals and in increasing doses. The total dosage, he said, should not be less than 20,000 skin-test doses, and many prefer to give a total of 80,000 to 100,000 skin-test doses. Many parents refuse to have their children immunised in this way because of the frequent injections. Reactions are more common than in the case of diphtheria immunisation and they sometimes take the form of "miniature scarlet fever." They can generally be avoided by making the initial injection a small one and increasing the dose gradually. Dr. Berry stated that there is no evidence that antibacterial immunity resulted; the effects appear to be only antitoxic. He suggested that this method of prophylaxis should still be used in those exposed to infection, and passive immunity with scarlet fever antitoxic serum reserved for use in children very badly exposed.

Dr. WILLIAM GUNN (London) dealt with prophylactic immunisation against measles. He stated that convalescent serum has given good results, but that this is difficult to obtain in sufficient amounts when it is most needed. At the beginning of an epidemic the demand is large, but a plentiful supply does not become available until the epidemic is subsiding. He described a method whereby serum can be dried and then reconstituted when required. The potency of serum treated in this way seems to be maintained for a long period. Normal adult serum has been found to be about one-third as potent as convalescent serum, but it is reasonably effective in modifying attacks. Dr. Gunn has found that immune globulin extracted from human placentas is not much more effective than adult serum and he has largely abandoned its use because of the reactions which sometimes follow. He referred to the occurrence of severe toxic hepatitis with jaundice in some cases which had been treated with one batch of serum. No satisfactory explanation has been arrived at, but a living virus may have gained access to that particular batch.

Dr. C. H. STUART-HARRIS (London) said that the isolation of a virus from human cases of epidemic influenza raised hopes that some form of immunisation would be effective. The virus can be isolated from most cases in large epidemics, but in small localised epidemics such isolation frequently fails. There is a tendency for influenza of the virus-positive type to be associated with a heavy mortality from pneumonia. Dr. Stuart-Harris then described immunisation experiments in humans given injections of formolised virus. Two years ago many people were treated in this way, but the epidemic of influenza broke out a month earlier than was expected and this invalidated the results. Recently, a series of boys on the naval training ship at Shotley were given three subcutaneous injections at two-weekly intervals. The results were not encouraging, and it may well prove that formolised virus is inactive. The possibility of using live virus for prophylactic purposes should be considered.

Dr. H. J. PARISH (Beckenham) expressed his dissatisfaction with the status of prophylactic measures against diphtheria in this country and pleaded for their more widespread use. In discussing the relative merits of the various immunising preparations available, he said that F.T. (formol-toxoid) is apt to give undesirable reactions and is less efficient than A.P.T. (alum-precipitated toxoid) and T.A.F. (toxoid-antitoxin floccules). A.P.T. is the most potent antigen, but it sometimes produces reactions in older children and in adults, in whom T.A.F. might therefore be substituted. The latter should certainly be used if there is sensitivity to a detector dose of A.P.T. T.A.F. contains a little serum and accordingly sometimes causes serum-sickness, but the frequency of this occurrence has now been reduced by the use of refined serum which has been concentrated by proteolytic enzymes and so has a lower protein content. For high-grade immunisation the interval between injections is of more importance than the size of the dose. Four weeks should elapse between the first and second injections, but if three injections are given the interval between the second and third need not exceed two weeks. Dr. Parish believes that the Schick test is of great value in assessing the efficacy of immunisation, but it has the defect of individual variation and a zone of partial immunity separates positive and negative reactions. He said that it may be necessary to give periodic injections of T.A.F. or A.P.T. in order to achieve permanent immunity—e.g., a child may be reinoculated when he first goes to school and again when 9 years old. The Schick test may be omitted if it becomes customary to give reinoculations in this way.

SECTION OF PATHOLOGY AND BACTERIOLOGY

Prof. JOHN CRUICKSHANK (Aberdeen) presided over this section, and a discussion on

Non-infective Enlargement of the Lymph-nodes

was opened by Dr. JOAN ROSS (London). She described the architecture of the lymph-gland and the character of the cells forming it. According to Maximow a supporting stroma is present in all lymphoid tissue. This stroma consists of a framework of reticulin fibrils, closely connected with which is undifferentiated syncytium. The syncytium is mesenchymal in origin and has the capacity of multiple differentiation. When stimulated the reticular syncytium may give rise to reticulum cells. Specially differentiated reticulum cells called "littoral cells" are found in the various sinuses of the spleen, bone-marrow and liver. There is therefore a common or stem-cell type which when given the appropriate stimulus can differentiate along various lines. In the normal adult the stimulus for the development of the myelocyte is in the bone-marrow and for the lymphocyte in the lymphadenoid tissue. In disease the stimulus may act in an abnormal situation or the stimulus itself may be abnormal. The derivatives of the syncytium, reticulum-cells, lymphocytes of all sizes and histiocytes lie in the meshes. At the edge of the sinuses reticulin fibrils are condensed and some of them cross the lumen of the sinuses and continue into the capsule. These fibres support the littoral cells. The follicles contain few reticulin fibrils, the reticular syncytium forming a supporting stroma for all types of lymphocytes. She thought there is probably a specificity of action by unknown agents on sinus, medulla and follicles causing a hyperplasia of the reticular tissue.

Dr. Ross then went on to illustrate and classify the reticulosis which she defined as a progressive hyperplasia of reticular tissue with differentiation to one or more cell-types. It can be systematised throughout the body or free cellular elements may be present in the blood as in the leukæmias. The three large groups are the medullary, follicular and sinus reticuloses. In medullary reticulosis there are undifferentiated mesenchyme cells in the medullary tissue or in the pulp of lymph-nodes or of the spleen and liver, and possibly in the connective tissues of the body. It may be primary, in which case free cellular elements may appear in the blood, and either hæmic as in the leukæmias, or histiocytic or fibromyeloid as in lymphadenoma. The other group of medullary reticuloses is the metabolic, such as Gaucher's disease and Niemann-Pick disease. In follicular reticulosis there is a hyperplasia of undifferentiated cells in the lymph-follicles and malpighian bodies of the spleen and production of follicular structure in bone-marrow. The types are lymphoid, lymphoid and histiocytic, and giant-cell and fibrillary. In sinus reticulosis there is a hyperplasia of littoral cells in the lymph-sinuses and in the various sinuses of the spleen and bone-marrow. Tissue histiocytes may also be involved.

Dr. A. H. T. ROBB-SMITH (Oxford) dealt with the reticulosarcomata, which include the lymphosarcomas and Ewing's tumour of bone. These are, he said, proliferations of mesenchymal cells or their progeny which result in stromal destruction as well as infiltration. The destruction is best recognised in such organs as the kidney and thyroid. In many cases the reticulosarcomata shows evidence of true embolic metastasis. Little is known of the frequency of these tumours but evidence from the Dutch East Indies suggests that they are more common in native peoples. Of 450 examples of primary lymphadenopathy which he and Dr. Bodley Scott examined 12 per cent. were reticulosarcomas. The greatest incidence is usually between the ages of 50 and 60, but a few arise in young adults. Anatomically there are three groups of reticulosarcomas. The first are those with a primary lesion in an area of lymphoreticular tissue with secondary involvement of the regional lymph-nodes and subsequent metastasis to distant organs by the blood-stream; this is common in the pharyngeal lymphoid ring, the small intestine and the bone-marrow. Secondly, there are reticulosarcomas arising from a pre-existing reticulosis such as lymphoid leukosis or lymphadenoma proper. This association has been emphasised by many writers but Dr. Robb-Smith does nor believe that the proportion of patients with reticulosis showing malignant change is any higher than in neurofibromatosis. The third group are those showing a generalised reticulosarcomatosis analogous to the classical lymphosarcomatosis of Kerndrat. Apart from the second group abnormal cells in the circulating blood are rare.

Dr. Robb-Smith said he had adopted a cytological classification of these tumours similar to that of Gery and Bablet. Showing photomicrographs of the various types he remarked that there are many undifferentiated forms; all the cases described as arising from littoral cells he regards as examples of secondary carcinoma in lymph sinuses. From a clinical point of view it is difficult to give a satisfactory picture because the tumours are protean in character and may arise anywhere in the body. Generally the growth is rapid and painless and interference with function is the first symptom. The lymph-nodes are soft and become moulded into a solid mass. The inguinal nodes are commonly the first to be involved—an unusual position in early Hodgkin's disease; and furthermore the patient is often over 45. There is no doubt that irradiation is the treatment of choice except for tumours of the intestine and bone-marrow where excision followed by irradiation is best. The survival of all cases averages about two years, but some patients are well even after seven years. The speaker concluded by appealing for a centralisation of information about the primary lymphadenopathies, on the lines of the American bone-sarcoma registry. Only in this way, he believes, can adequate knowledge be got about the prognosis and best method of treatment for an individual patient.

Dr. W. B. DAVIS (Blackpool) spoke of the experimental aspects of Hodgkin's disease. Among 230 Gordon's tests there were 8 false results; it is important to remember that spasticity and ataxia are the criteria of the positive test-rabbit and that salivation and fits are due to cerebral trauma and not to any agent in the gland. Speaking of his alternative to the Gordon test, which he called "a Friedman test," Dr. Davis said that in his hands it has been considerably more accurate. It has the advantages of being applicable to post-mortem material and to pus. He emphasised that the test does not replace but is only complementary to histological examination. To the criticism that a positive result may be given by normal tissues such as eosinophils he answered that he has obtained a positive Friedman in tissues which had no such cells. There is a possibility of certain reticulum-cells playing a part in the reaction and in any case the

test is a biological means of distinguishing a particular type of cell.

Dr. C. E. VAN ROOYEN (Edinburgh) agreed on the greater delicacy of the Friedman test. He does not now believe in the virus theory of Hodgkin's disease, but thought it would be unwise to bang the door on this explanation till more is known of viruses. The disease appears to be neoplastic, since transmission has been impossible. Reticulum-cells, or certain of them, probably contain the active agent. When he exposed Gordon's agent to X-radiation he found it was not inactivated. Some of the cells in lymph-adenomatous tissue are altered in such a way as to give certain of the biological properties of normal bone-marrow. Dr. van Rooyen noticed a relationship between the prognosis of a case of lymphadenoma and the positivity of the Gordon test. It is necessary to remember that the histological picture sometimes changes at different stages of the disease.

Dr. ROBB-SMITH said that often Hodgkin's disease does not give a positive test, but he could not deny that a special type of reticulum-cell may be responsible. It is important to remember that large numbers of granular leucocytes almost always do give a positive test.

Dr. Ross, in reply, pleaded for careful histological examination of all suspected nodes and for better coöperation between pathologist and radiotherapist. The Friedman test and sternal puncture will help to correlate different types of disease.

Dr. R. J. V. PULVERTAFT (London), speaking on sterilisation of dressings and surgical appliances, expressed grave doubts of the efficacy of general hospital sterilisation. Often the pressure gauges on autoclaves bear no relation to the temperature, and much of the apparatus is out of date. He has isolated *Bacillus sporogenes* and *B. tetani* from material alleged to be sterile. The too tight packing of drums, and the including of various folded materials, is often responsible for improper sterilisation. The finer the texture of a dressing the more difficult it is to sterilise and wood-pulp dressings are worst. Talc for the surgeons' gloves is another source of infection, and even at full pressure of the steriliser it is almost impossible to kill anaerobes. Speaking of the surgeon's mask, he said his tests showed that hæmolytic streptococci may be held up in the layers of the mask during normal breathing but are forcibly expelled in large numbers when the surgeon coughs. He concluded with a plea for air-conditioning in all theatres and expressed the view that the impregnation of dressings with antiseptics is probably worth while.

Prof. C. H. BROWNING, F.R.S. (Glasgow), said that publicity is needed for Dr. Pulvertaft's ideas. Hospital sterilisation in many cases has degenerated into a ritual.—Dr. PULVERTAFT, in reply, thought that its chief fault is that it is largely out of the control of the bacteriologist.

Dr. A. C. LENDRUM (Glasgow) read an occasional paper on glomangiomas.

REVIEWS AND NOTICES OF BOOKS

Sterility and Impaired Fertility

By CEDRIC LANE-ROBERTS, M.S. Lond., F.R.C.S., F.R.C.O.G., gynæcological surgeon to the Royal Northern Hospital, London; ALBERT SHARMAN, M.D. Glasg. M.R.C.O.G., assistant surgeon to the Royal Samaritan Hospital for Women, Glasgow; KENNETH WALKER, M.B. Camb., F.R.C.S., surgeon to the genito-urinary department of the Royal Northern Hospital; and B. P. WIESNER, D.Sc., F.R.S.E., consulting biologist to the Royal Northern Hospital. London: Hamish Hamilton. 1939. Pp. 419. 14*s*.

AT a time when the population problem is being widely discussed the appearance of this book is opportune. While it is uncertain how much of the nation's reduced fertility is due to an increase in involuntary sterility, it is obvious that, from the demographic standpoint, the question is far from negligible. Indeed, the establishment of one or more centralised clinics for the diagnosis and treatment of sterility is likely to be a part of any organised population policy which, in coming years, the Government may introduce. For such clinics, this volume would be invaluable.

Of the many advances which have recently been made in the analysis of sterility, none is more important than the recognition of the part which is played by the male; and the chief of the many merits of this book is that it deals in equal detail with the two sexes. The causes of sterility, when systematically reviewed, are so numerous and diverse that, to anyone who had not enjoyed a training in biology, it would be a source of astonishment that as many as 85 per cent. of marriages are fertile. The fact that several specialties—andrology, gynæcology, pathology and endocrinology—have staked out claims on the territory which this book covers, imposes the necessity of multiple authorship. Yet the volume has none of the shortcomings which are all too familiar in the symposium. The different sections are, in the first place, exceptionally well coördinated so that there are neither inconsistencies nor hiatuses. Then the subject matter, which is in parts (particularly those concerned with endocrinology) highly complex, is presented in a logical and carefully planned sequence with a judicious use of headings, subheadings and cross-references. The literary style is throughout uniformly smooth, terse and clear. The whole book bears witness to an unusually strict and meticulous standard of editing. The descriptions of the numerous tests in the diagnosis of sterility are supplemented by cautious evaluations of their reliability in the light of our present knowledge.

The book deserves to be read by a wide medical public. We hope that the authors will keep it up to date by producing revised editions as further relevant information accumulates. It is attractively produced with numerous clearly explained tables and illustrations.

Nelson New Loose-Leaf Medicine

Renewal pages. London: Thomas Nelson and Sons. 1939.

THE latest pages of the Nelson Loose-leaf Medicine make up the deficiencies in the work to which we have previously called attention. New articles replace the old on bronchopneumonia, erysipelas, metabolism, obesity, beri-beri, pellagra, diséases of the thyroid gland, Hodgkin's disease, tuberculosis of the lymphatics, bronchoscopy, pulmonary emphysema, and spontaneous pneumothorax; and there is a new article for the "survey volume" on sulfapyridine (M. & B. 693). These are reasonably uniform in plan, and present modern orthodox views in a straightforward way, with the more important references appended to each article. Dr. Frederick T. Lord gives a detailed account of the bronchopneumonias ranging from the hypostatic type to that associated

with various specific infections, such as tularæmia and plague; perusal of this article strongly supports the impression that the old "anatomical" classification of the pneumonias has outworn its usefulness and should be replaced by one based on ætiology wherever possible. In the section on emphysema, Dr. D. W. Richards uses the term "obstructive" to describe the common large-lunged emphysema; this is in accordance with current American practice, but implies a theory of ætiology that is not everywhere accepted as operative in all cases. The section on diseases of the thyroid, coming from the pen of Dr. J. H. Means, is authoritative, but many readers would have liked more about the heart in thyrotoxicosis. Dr. Hans Kjaergaard contributes a brief but informative article on spontaneous pneumothorax, a subject which his own researches have done much to elucidate. The present position of sulfapyridine (M. & B. 693) is well summarised, but the mention of two isolated reports of the use of the drug in infective endocarditis and in a staphylococcal infection taken alone present an unduly optimistic picture.

The Medical Applications of the Short-Wave Current

By WILLIAM BIERMAN, M.D., attending physical therapist, Mount Sinai Hospital, New York City; assistant clinical professor of therapeutics, New York University College of Medicine. London: Baillière, Tindall and Cox. 1938. Pp. 379. 22*s.* 6*d.*

THE doctor who proposes to apply a new agent in therapy or to extend its use should not only be conversant with the manifestations of the disease to be treated but also have some scientific knowledge of the agent he proposes to employ. Dr. Bierman has wisely enlisted the services of a physicist, Myron M. Schwarzschild, M.A., who has contributed a valuable section on the physical and technical aspects of high-frequency currents. Beginning with fundamentals, the reader is very gently initiated, step by step, into the secrets of ultra-short waves. A good survey of European and American clinical methods is presented with commendable reserve. The handbook will be found valuable to any practitioner who is thinking of using this comparatively new physical agency.

The Dream World

A Survey of the History and Mystery of Dreams. By R. L. MÉGROZ. London: John Lane, the Bodley Head. 1939. Pp. 319. 10*s.* 6*d.*

DREAMS have always attracted the attention of mankind, and their interpretation has been a function of the learned of all ages. To the primitive mind, a dream is a direct message from some force outside the dreamer, and the fear that it may foretell some disaster leaves him uneasy until a satisfactory interpretation has been found. This idea dies hard, and we still have our quota of primitive minds in all walks of life today.

Mr. Mégroz has made a serious study of the whole subject, and traces the story of dreams and their significance throughout history. He accepts the Freudian conception of dreams but objects to its being so closely bound up with psycho-analytical therapy. His examination of the subject has led Mr. Mégroz to believe that a dream may retell past events unknown to the dreamer, and may in some instances foretell the future. He gives examples to illustrate his theories, many of them experiences of well-known people. Mr. Mégroz makes no assertions. He puts forward his views and gives his examples, and is content to leave the reader to make his own deductions.

This book makes interesting reading and provokes thought. If the author's adherence to theories which have long been considered outworn also provokes criticism, it should not on that account be too lightly dismissed.

Medical Opinions on War

Issued by the Netherlands Medical Association. Amsterdam: Elsevier Publishing Co. 1939. Pp. 72.

THIS pamphlet is issued in England by the committee for war prophylaxis of the Netherlands medical association and contains short essays by a number of psychiatrists, principally British, Dutch and American. Their aim is "to enlarge the self-knowledge of common citizens and politicians. . . . (They) do not pretend to any scientific discoveries; they sound the voice of medical common sense." The contributions are of unequal value and in one or two cases hardly merit the title of medical. Amid a wide variety of opinion expressed, there is, however, considerable agreement on the value of studying war from the psychological side. Many of the authors draw attention to the importance of unconscious aggression, and the tendency of individuals to behave in groups on a lower cultural plane than they would if alone. The relation of aggression to frustration is also frequently touched upon, and the value ofreasonableness and compromise in international relations as well as in private affairs is stressed.

Few of the essayists seriously tackle the question of prophylaxis, but those who do recommend a variety of highly controversial courses. From this it appears that although psychopathology has already much to contribute towards an understanding of warfare, it is altogether premature to prescribe a preventive regimen.

Chronic Arthritis

By ROBERT T. MONROE, A.B., M.D., physician to the Peter Bent Brigham Hospital, and chief of the Medical Staff of the Long Island Hospital, Boston, Massachusetts. London: Humphrey Milford, Oxford University Press. 1939. Pp. 84. 8*s.* 6*d.*

THIS monograph is reprinted from the Oxford Loose-leaf Medicine and is an admirable exposition. The sections on pathology and ætiology are clear and comprehensive. At times brevity is carried almost too far and statements are made which, while probably true, deserve fuller argument; the place of circulatory disturbances in the ætiology of rheumatoid arthritis is dealt with in five lines. In conformity with the American usage the terms atrophic and hypertrophic are used instead of rheumatoid and osteo-arthritis, and no attempt is made to differentiate between rheumatoid and infective arthritis as is sometimes done in this country. Periarticular fibrositis is described as a third form and this nomenclature, which has much to commend it, enables the author to include a very useful section. The observations on prognosis in atrophic arthritis and the attitude of the physician deserve to be widely read. Treatment is practical and free from fads and a sound and useful scheme of diet is given.

The book bears the stamp of wide personal experience and trained observation, and may be studied with advantage not only by the general practitioner, for whom it is primarily intended, but also by specialists in the subject.

THE LANCET

LONDON: SATURDAY, SEPTEMBER 9, 1939

TOWN INTO COUNTRY

BEFORE the war, as we must soon be saying, charities planned to send some town children every year for a few days or weeks into the country, and their organisers dreamt of ways and means by which all town children might go. Others, more imaginative still, schemed to move out the town hospitals, leaving only enough to deal with emergencies and outpatients. This week war has made these dreams come true, and though its later horrors must perhaps inevitably outweigh its early blessings at least it starts with something on the right side. The actual mechanism of evacuation, both of children and hospitals, worked smoothly, and, except for some northern towns where the urgency is not so great, the task was finished by the middle of the week. Between Friday morning and Sunday night the L.C.C., acting as the Government's agent, moved out from London half a million school-children, expectant mothers, and blind people, and on Monday these were followed by the younger children with their mothers, and their brothers and sisters of school age who had stayed behind so as to keep families together. With the parties went nearly all the council's teaching staff, some 20,000 voluntary helpers to look after the pre-school children, and the necessary midwives. The blind and the expectant mothers near their time went by motor-coach; the others travelled by rail. A quarter of those expected failed to turn up, partly because of holidays and hop-picking, and many others came on the spur of the moment. Nevertheless, the council were able to make good their promise that if evacuation was ever ordered it would be an orderly operation. The hospitals in danger areas divided their patients into three categories: those fit to go home; those fit to move but still needing inpatient treatment; and those unfit to move. Many in the first category were sent home before the week-end. The second category, the stretcher-cases, were moved out of London on Sunday, mainly by Green Line coach or private car, to the country hospitals that have been enlarged or partially emptied to receive them. Only the third category remain. Here again there was no major hitch.

The complications of evacuation cannot yet be foreseen. In the hospitals they seem likely to amount to no more than inconveniences. Among the children the risk of infection cannot be denied. Children from crowded cities, which may be considered as permanent epidemic centres of the common infectious diseases, are carrying specific organisms into rural districts which may be, but often are not, permanent epidemic areas for those same organisms. The result will depend not so much on whence the emigrants came as on where they have gone, and the risk, where there is any, is much less to the evacuees than to those on whom they are billeted. The transference from one place to another will not necessarily disturb the epidemic equilibrium provided there is no overcrowding and the two places are in a similar epidemic state. Thus, if Portsmouth is evacuated into Bournemouth without overcrowding, Bournemouth has nothing to fear—a comparable migration takes place every year at holiday time and nothing usually happens. Where the children are sent to small circumscribed towns such as Ipswich, as Dr. A. M. N. PRINGLE, its medical officer of health, has lately pointed out,[1] the effect may be different, for if such a town has been free from any one of the endemic infections for some time the immunity of the residents will be low and the risk of infection correspondingly high. A special case is the small community relatively protected from diphtheria by artificial immunisation. In some of these districts there are no chronic carriers of diphtheria and the artificially acquired immunity is sufficient to protect the population from diphtheria. But if children come to such a district from an epidemic area and include, as they are sure to do, some carriers, diphtheria may spread among the non-immune residents. Town children sent to isolated rural districts may then be expected to set up epidemic situations among the native population, severe if there is much increase in the population density, troublesome and lingering if the newcomers are well scattered. The risks of diseases not spread by droplets will depend mainly on the state of sanitation, and here again the sparsely populated rural district is the most likely to suffer.

Thus, though all reception areas must expect some increase in the number of cases of infectious disease corresponding to the increase in the population at risk, and also some interchange of parasites, it is only in the most rural areas that real trouble is likely to arise, and these must make sure that they are in as good a position as possible to deal with it. Preventive measures (which are set out in greater detail on page 618) will include the examination of evacuees for obvious nasopharyngeal infection, systematic immunisation of native children against smallpox and diphtheria, adequate spacing in dormitories and schoolrooms, extra care of drainage systems and milk, food and water-supplies, and adequate augmentation of isolation-hospital and laboratory facilities and of the public-health staff in reception areas. With such precautions it is hard to believe that the ills that may befall the natives will seem of any significance when compared with the gain, both in health and experience, of the newcomers.

SHOULD LOCAL GOVERNMENT INQUIRY REPORTS BE PUBLISHED?

THE system of public local inquiry is so valuable an instrument of local-government administration that it may be worth while to ask whether it operates to the best advantage. Recent events at Stirling offer an instance, if not perhaps a very

1. Pringle, A. M. N., *J. R. san. Inst.* August, 1939, p. 71.

important one, for examination. The Stirling borough council, having decided to remove its medical officer of health, suspended him from office and applied to the Department of Health for Scotland for the requisite statutory consent to his removal. The department caused a public inquiry to be held by a commissioner, Mr. CHARLES MACINTOSH, K.C., sheriff principal of Argyll, assisted by a medical assessor. For some ten days the inquiry ranged over local affairs and personalities in Stirling. Finally the commissioner reported to the department which has now informed the town council that the removal of the medical officer is sanctioned. But apparently the council itself does not emerge scatheless from the investigation. The department asks the council to send a representative delegation to Edinburgh early in September in order to discuss certain questions arising out of the inquiry. The council has resolved that its full public-health committee shall represent it in the Edinburgh discussions. But some of the councillors plainly thought that the council was entitled to know in advance the subjects to be dealt with—in other words, to have the chance to prepare itself to answer criticisms, if any, contained in the unpublished report of the commissioner.

The purpose of the recent inquiry at Stirling was, of course, strictly limited. The issue was whether or not the department would confirm the dismissal of the medical officer. That issue has been settled. But, in the course of settling it, there were naturally complaints of existing arrangements. Thus, to take a single instance, a medical witness commented on the system of examining swabs for diphtheria at Stirling. "If I send in a swab at 6 P.M. on Friday," he observed, "it is too late for office hours: the swab is dealt with on Saturday morning and is sent to Glasgow: Glasgow receives it after office hours and deals with it on Monday: you get the result on Tuesday and the funeral is the same day." It is by no means clear that the medical officer was to blame for the system of sending swabs to Glasgow. However that may be, the town council itself was in some degree on trial at the inquiry. But, whatever faults were hinted or disclosed, the peculiarities of our so-called administrative law reveal themselves. The commissioner hears the evidence and forms his opinions thereon; yet he is not the judge who makes the decision. Somewhere behind the scenes an anonymous official in the department studies the commissioner's unpublished report and eventually, after the file has been circulated to appropriate colleagues, the impersonal judgment is promulgated. The outgoing medical officer of health has not seen his judge face to face. The town council does not know what charges are being levelled at its administration. No official report of the case will appear. There will be no statement of reasons for the departmental decision such as would help Scottish local authorities in similar positions another time.

These comments are not intended to suggest that there is anything improper about our system of local government inquiries. The inquiry is not a criminal trial. Local feelings have been usefully ventilated. The citizens in Stirling and elsewhere are in consequence able to feel that no scandal is being hushed up. Indeed the system of such inquiries was justified after a strong legal challenge in Local Government Board *v.* Arlidge in 1915. The House of Lords then upheld the departmental method, incidentally correcting the Court of Appeal wherein the judges by a majority decision had said that the method was contrary to "natural justice." Nobody can doubt that the best way to remove any possible deficiencies in public-health administration in Stirling is for the public-health committee to discuss matters with the central department. Nevertheless there remains the question whether our central authorities' control is not at times a little too mysterious and secretive. The Arlidge case concerned a property-owner's objection to a closing order for a house in Hampstead alleged not to be fit for human habitation. It was therefore quite different from the issue in the Stirling case. But there is one feature common to both occasions—the non-publication of the report of the person holding the inquiry. The late Lord SUMNER made some characteristic observations in the Arlidge case which the Committee on Ministers' Powers thought worth quoting in its report in 1932. "If it was our function," he said, "to advise the Local Government Board as to its procedure generally . . . I should for my part suggest that the more open the procedure is the better. By all means let both the appellant and the local authority see the inspector's reports; a discreet and careful officer is not likely to offend, and if, in spite of discretion and care, he is harassed by actions for libel, he may well be defended and indemnified by his department. By all means let the appellant, and the local authority too, if it wishes, see and address the judge: it is all in his day's work. By all means let the appellant have the last word and as many of them in reason as he likes. Time spent in removing a grievance, or in avoiding the sense of it, is time well spent; the Board's officials will, like good judges, amplify their jurisdiction by rooting it in the public confidence."

ŒSTRONE AND PROGESTERONE IN THE ADRENAL GLAND

SINCE GORDON HOLMES gave his now classical description of virilism in a woman cured by the removal of an adrenal tumour, several similar cases have been reported, and it is now well established that overgrowth of the adrenal cortex may lead to masculinisation of the secondary sexual characters and to retrogressive changes in the internal reproductive organs. Complementary observations have been made on analogous, but much rarer, cases in which a partial feminisation of men has occurred from a similar cause.[1]

For many years no satisfactory advance was made in the analysis of this peculiar relationship between the adrenal cortex and the sex characters, but lately advance has come from three sides. The importance of the adrenal cortex in the body's

1. Simpson, S. L., and Joll, C. A., *Endocrinology*, 1938, **22**, 593.

economy has led to much work on the identification and preparation of the life-maintaining principles of the cortex, which prove to be of very similar chemical constitution to the hormones of the gonads.[2] Secondly, examination of the urine in cases of adrenal tumours and adrenal hyperplasia, associated with masculinisation or feminisation, has shown that this is one of the few conditions, other than pregnancy, in which an easily detectable abnormality can be found in the hormonal activity of the urine. An excess of androgenic material is associated with masculinising tumours in women [3 4] and an excess of œstrogenic substances with feminising tumours in men.[5] The excess androgenic activity seems to be largely accounted for by the presence of massive amounts of *trans*-dehydroandrosterone, but as this substance is a very weak androgen it is perhaps only an excretion product of the androgenic substance primarily responsible for the masculinisation. The additional œstrogen in the urine of males with adrenal tumours has not been identified with certainty, but is probably œstrone. An extragonadal source of sex steroids is also implied by another observation made in the course of hormone analysis of body fluids—i.e., that gonadectomy does not cause the disappearance of androgens and œstrogens from the urine—and of possible sources the adrenal gland is much the most probable.[6]

The third line of approach consists in the examination of cortical tissue itself for the presence of substances identical with, or of similar biological activity to, the well-known hormones of the ovary and testis. The first success in this direction was attained in 1936 by REICHSTEIN, who isolated from adrenocortical extracts a substance, "adrenosterone," which had definite androgenic properties as tested on the capon comb, and which differed from well-known members of the androsterone-testosterone series only in having an extra oxygen group in the molecule. His discovery indicated that substances with sex-hormone activity are present in the cortex, although the particular substance adrenosterone, being a weak androgen, is perhaps unlikely to be responsible for the major phenomena of virilism in women. In the past year, two observations have been made which definitely link the adrenal gland metabolically and perhaps endocrinologically with the gonads. BEALL and REICHSTEIN [7] and BEALL [8] have isolated, from concentrates of very large amounts of ox adrenals, a substance identical chemically and biologically with the hormone of the corpus luteum, progesterone, which previously had been obtained only from the corpus luteum itself. Very recently BEALL [9] has also obtained from adrenal extracts œstrone in crystalline form identical with the substance found in human pregnancy urine. The latter observation is especially striking since œstrone has not yet been isolated in pure form from the ovary, and BEALL's isolation of it from the adrenal cortex is its first preparation in pure form from any kind of tissue.

These three lines of work point quite definitely to the fact that the adrenal gland normally contains—probably as the result of elaboration there—small amounts of substances identical with or similar to the hormones of the gonads, and that under certain conditions of hyperplasia or malignant growth the output of these or similar substances can so be augmented that the sex characters of the subject are fundamentally altered. It is impossible with our present somewhat limited knowledge of the metabolism of the steroid substances to postulate whether this anomalous presence of biologically active substances in the cortex is incidental to the large-scale production of the chemically similar life-maintaining hormones, or whether they are produced by the cortex independent of the elaboration of corticosterone. In this connexion, of course, a study of the sex steroids present in the cortex or excreted in the urine in cases of known deficiency of the life-maintaining principles, as found in Addison's disease, would be instructive; but progress of this kind is necessarily slow. Moreover, it should be emphasised that the observations on the urine in cases of adrenal hyperplasia and adrenal tumours, as well as of the physiological effects of these conditions, have all been on the human subject, whereas the large-scale examination of adrenal extracts has necessarily been carried out on animal material. It seems likely, however, that this separation will not be permanent. DAVIDSON and MOON [10] have shown, for instance, that the artificial stimulation of the adrenal cortex by the administration of corticotrophic extract of the anterior pituitary may cause some restoration of the atrophic accessory sex organs of gonadectomised male or female rats. Conversely, the development of microchemical methods will probably make possible the chemical examination of hyperplastic or tumourous adrenals, or even of the normal gland.

2. Reichstein, T., *Ergbn. Vitamin- Hormon-forsch.* 1938, **1**, 334.
3. Simpson, L., de Fremery, P., and Macbeth, A. N., *Endocrinology*, 1936, **20**, 363.
4. Callow, R. K., *Proc. R. Soc. Med.* 1938, **31**, 841.
5. Burrows, H., Cook, J. W., Roe, E. M. F., and Warren, F. L., *Biochem. J.* 1937, **31**, 950.
6. Parkes, A. S., *Lancet*, 1937, **2**, 902.
7. Beall, D., and Reichstein, T., *Biochem. J.* 1938, **32**, 1957.
8. Beall, *Nature, Lond.* 1938, **142**, 479.
9. Beall, *Ibid*, July 8, 1939, p. 76.
10. Davidson, F. A., and Moon, H. D., *Proc. Soc. exp. Biol.* 1936, **35**, 281.

The International Hospital Association Congress at Toronto arranged for this month has been postponed indefinitely.

The annual conference of the Sanitary Inspectors' Association, which was to have been held at Bournemouth this week, has been postponed.

The Tavistock Clinic (for functional nervous disorders) has now been transferred to the Orchard Wing, Westfield College, Kidderpore Avenue, Hampstead, N.W.3 (Tel. Hampstead 4626), near the junction of Finchley Road and Platt's Lane. In addition to the usual work of the Clinic, private practice on a pooled basis is being carried on by a large resident staff. Appointments for both Clinic and private patients will be made by the Secretary at any time.

The Lancet will for the present be printed at Aylesbury, and urgent communications may be addressed to the editor at Messrs. Hazell, Watson & Viney's printing works there. The London office remains open at 7, Adam Street, W.C.2. (Tel. Temple Bar 7228–9.)

ANNOTATIONS

DRUGS IN WAR-TIME

THE outbreak of war finds this country in a far better state as regards supplies of essential drugs than was the case in August, 1914. Under the protection of the Safeguarding of Industries Act the manufacture of medicinal chemicals and synthetic products has become a staple industry of Great Britain and there is no need to fear a shortage of such articles. The raw materials of this industry are available in sufficient quantity to ensure that the large existing stocks of the finished products can be replaced as need arises. No likelihood of substantial advances in the prices of drugs in this category can be foreseen at the moment and certainly no famine in them is conceivable. At all times, however, it is desirable that care should be taken to conserve stocks and to avoid waste and at no time should the rules of economy be observed more rigorously than in time of war. Many important drugs are brought to this country by sea and a number of others require for their production raw materials which also have to be imported. Thus this country depends for its supplies of the vast majority of the items of vegetable materia medica upon outside sources; similarly our requirements in the way of metals, mercury, and bismuth have to be derived from abroad and the same applies to bromine and iodine. While then Great Britain is self-supporting so far as its needs for the coal-tar derivatives used in medicine are concerned, there may later be occasion for economy in some other categories. Substantial stocks of mercurials, bismuth salts, bromides, and iodides are, we have no doubt, held in reserve while our supplies of the primary products from which they are manufactured will be controlled by the Government. Of the alkaloids, quinine, morphine, and codeine are prescribed more frequently in war-time than in normal times; all three are derived from vegetable raw materials brought here from other countries. It may be assumed that there are considerable reserves of these alkaloids as well as of cinchona bark and opium, and that, if necessary, steps will be taken to prevent any improper hoarding of stocks. Under the defence regulations the Government has power to require any person to furnish an estimate of the quantity of any substance held by him and to requisition all or any quantity of any article so held. It would be difficult to estimate the total quantities of any one of the many hundreds of vegetable drugs used in medicine, whether as powder, extract, tincture, or some other kind of galenical preparation. Apart from the stocks in bonded and other warehouses and in the premises of dealers, manufacturing druggists and wholesale houses there are some sixteen thousand chemists' shops and many thousands of other stores among which stocks are distributed. Should a temporary scarcity of any such drug arise as time passes the fact will be made known to members of the medical profession so that they will have an opportunity to adjust their prescribing.

FAMILIAL ADENOMATOSIS

MANY interesting and important facts about familial adenomatosis of the colon and rectum, or polyposis intestini, are set out in the paper by Lockhart-Mummery and Cuthbert Dukes on p. 586. The genealogical tables of ten families afflicted with this disease show clearly its hereditary nature. It may be transmitted by either sex, and is apparently due to a gene defect, which is responsible for an unduly active growth of the intestinal mucosa, followed by the formation of areas of hyperplasia, and later multiple adenomata. The active mitosis which is inevitably present helps to explain the development of carcinoma as a secondary phenomenon. It is shown that adenomata develop at about the age of 20 years, while malignant changes follow in the decade 30–40 or even earlier; hence polyposis should be suspected whenever a young subject is found to be suffering from cancer of the rectum. More than one focus of carcinoma is frequently present. A recent paper by Coffey and Bargen [1] also stresses the liability to malignancy; they found carcinomatous changes in 62·5 per cent. of cases of true adenomatosis (as distinct from the pseudo-polyposis associated with chronic ulcerative colitis), and in 25 per cent. there were multiple carcinomas. A useful clinical point mentioned by Lockhart-Mummery and Dukes is that polypi which are actively growing are darker in colour (dark red or brown) and firmer in consistence than quiescent growths. Coffey and Bargen also say of carcinomatous polyps that they presented "a dusky red hemorrhagic appearance which immediately aroused a suspicion of their malignant nature." The treatment of polyposis is a difficult problem; there is at present no known method of preventing the development of polypi. Since members of these families are faced with the grim prospect of years of medical supervision, with multiple sessions for sigmoidoscopy and fulguration of polypi, finally culminating at an early age in colectomy or radical excision of the rectum and pelvic colon for malignant disease, one may hope that polyposis families will remain small and finally die out as the result of celibacy or the adoption of eugenic principles. Married persons found to be suffering from polyposis should certainly be informed of the familial nature of the disease.

TREATMENT OF BURNS

THE weakness of tannic acid in the treatment of burns lies in its comparatively poor antiseptic action; the eschar fairly often gets infected, and the burn can then no longer be treated as a dry wound. In gentian violet a substance has been found that is non-irritant, strongly bactericidal and analgesic; but unfortunately it is a poor coagulant of devitalised proteins, and the eschar takes a long time to form. Its bactericidal action, according to Chen,[2] is exhibited mostly against bacteria of the gram-positive groups, and hardly at all against *Bacillus coli* or *B. pyocyaneus*. Chen in Peiping and Blackfield and Goldman [3] in San Francisco have been trying to evolve a technique that will combine adequate coagulation with efficient antisepsis. The American surgeons, who have worked mainly with severe burns in children, first immerse the patient in a tannic-acid bath in which ointments and the like, blebs and loose necrotic tissue are removed. Then, after drying the patient with sterile towels, they apply gauze soaked in 10 per cent. silver nitrate to the burnt area; this effectively seals the area before it has a chance of being infected. The patient is next placed on a sterile sheet under a large cradle kept at 85°–90° F. For the first few days the entire burnt area, including its edges, is treated several times a day with a 1 per cent. aqueous solution

1. Coffey, R. J., and Bargen, J. A., *Surg. Gynec. Obstet.* August, 1939, p. 136.
2. Chen, C. Y., *Chin. med. J.* 1939, **55**, 407.
3. Blackfield, H. M., and Goldman, L., *J. Amer. med. Ass.* 1939, **112**, 2236.

of gentian violet. Chen's experience has been mostly with the less extensive type of burn; only five of his patients were bad enough to be admitted to hospital. He does not use tannic acid but first cleans the burn with boric-acid solution or normal saline, removing oily dressings, if they have been applied, with soap; blisters are opened and loose epidermis cleared away. He then applies a 1 per cent. aqueous solution of gentian violet (crystal form) to the affected area, and after an interval of five to ten minutes applies the silver-nitrate solution. The gentian violet is reapplied two or three times at fifteen-minute intervals, and when the surface has been exposed to the air for two hours the patient is allowed to go home. No direct dressings are applied after the first treatment, the burns being either left uncovered or guarded by iron-wire screens covered with dry gauze. The dye is reapplied once or twice on the second day, and the wounds are then covered with a dry dressing which is removed for inspection daily for the first two to three days, and after that only every four days. In cases known to be infected with *B. coli* Chen replaces the gentian violet by a mixture of gentian violet, acriflavine and brilliant green. He says that only the first dressing is painful, and healing is very prompt. The eschar formed with gentian violet is pliant and does not crack in the body folds or at the edges, but its removal is not always easy. Chen recommends saline compresses to loosen the parts of the eschar that have not peeled off at the end of three or four weeks, but Blackfield and Goldman have not been satisfied with this method. They hold that any eschar remaining after this period covers third- or deep second-degree burns, and that if it is merely soaked off epithelisation will not take place. They favour surgical removal of the eschar under light general anæsthesia, and preparation of the resulting raw area for skin-grafting.

PITFALLS IN INJECTING FOR HERNIA

REPORTS on the injection of sclerosing solutions for the cure of herniæ usually make little mention of the unpleasant results that may follow possible accidents. Perhaps most of these reports are written by the specially skilled, at whose hands accidents do not happen. Wernicke[1] however feels it necessary to emphasise the fact that injecting a hernia is not a simple matter like giving a hypodermic injection. The two most serious calamities which can occur are injection into the peritoneal cavity and injection into the deep epigastric vessels. Wernicke quotes two deaths, reported by another writer, in which the solution was injected into the bowel wall with resulting gangrene, perforation and peritonitis; he adds that it is quite wrong to think that intraperitoneal injection is not of serious consequence. Injection into the deep epigastric artery may be followed by sloughing of the deep tissues. The obvious safeguard is to withdraw the plunger a little way before starting the injection. All patients who experience severe abdominal pain after injection should be treated as potential cases of peritonitis and kept under careful observation.

Œdema of the cord, hydrocele of the cord, epididymitis and dermatitis under the truss worn during treatment all seem to be of minor significance, but it is as well to recognise that they may occur. Abscess formation may be troublesome and does occasionally arise even in skilled hands. Harris and White[2] report a series of 236 cases treated by injection without a single serious complication. No abscesses occurred and no impotence resulted. They consider that there is little difference in the fibrosis produced by the two types of solution in popular use—those containing tannic acid in alcohol and those containing a fatty acid basis. It is perhaps as well to mention that the solutions in use for the injection treatment of varicose veins are not suitable. Wernicke believes, as a result of experimental work, that phenol-alcohol-thuja solution gives the most enduring scar tissue.

It is rather disappointing that these authors all restrict the injection treatment to the small indirect inguinal hernia in healthy patients, in fact to the cases which most certainly give good results from operation. Harris and White have taken great pains to analyse their results and compare them with results of operation. The analysis is in favour of operation. It has at times been urged that treatment by injection saves the patient time and money. This Harris and White are inclined to doubt; the prolongation of the treatment and the number of visits entailed cause great inconvenience. Wernicke thinks that 10 injections should suffice for most cases, and that when 20 or 40 are required the case has been badly chosen. He gives a good practical tip to prevent the formation of subcutaneous nodules. The syringe should contain a little air above the solution, and, after the injection, this air is forced through to clean the needle before its withdrawal.

1. Wernicke, H. O., *Surg. Gynec. Obstet.* June, 1939, p. 1093.
2. Harris, F. I., and White, A. S., *J. Amer. med. Ass.* 1938, **111**, 2009.

TETANUS ANTITOXIN

SOME confusion may still exist owing to the two units employed for expressing dosage of tetanus antitoxin. The international unit (I.U.), adopted by the Permanent Commission on Biological Standardisation, is now used in this and many other countries, whereas the American unit (A.U.) is still employed in the United States and elsewhere. The relation between A.U. and I.U. is 1 : 2. The routine prophylactic dose at the beginning of the last war was 500 A.U., and there was a tendency later to increase this to 1000 or even 1500 A.U. The memorandum issued by the Director-General of Emergency Medical Services last week (see *Lancet*, Sept. 2, 1939, p. 578) recommends a prophylactic dose of about 2600 I.U., equivalent to about 1300 A.U., or some two and a half times the old routine dose.

OXYGEN AND THE BRAIN

ALTERATIONS in brain metabolism—mainly and essentially a matter of the burning of dextrose—occur in the new "shock" treatments of schizophrenia, and many attempts have been made to find in them the effectual happening common to all these therapies. Some have assumed that cerebral anoxia is the answer.[1] Russell Fraser and Reitmann[2] in this country, and Himwich[3] and his associates in the United States, have turned this interpretation to practical account by causing in schizophrenic patients temporary acute anoxia by the inhalation of nitrogen. The therapeutic value of the method is doubtful, but the significance of cerebral anoxia remains an urgent question. Gerard,[4] who has lately reviewed the whole topic, would attribute the effect of thyroid treatment in schizophrenia to its power of increasing the rate of respiration and the use of sugar in the brain; he regards the low basal metabolic rate and the relative insensitiveness to thyroid of one group of schizophrenics as prima-facie evidence of lowered brain

1. See *Lancet*, 1938, **1**, 37, 210.
2. Fraser, R., *J. Neurol. Psychiat.* 1939.
3. Himwich, H. E., Alexander, F. A. D., and Lipetz, B., *Proc. exp. Biol. Med., N.Y.* 1939, **39**, 367.
4. Gerard, R. W., *Arch. Neurol. Psychiat., Chicago*, 1938, **40**, 985.

metabolism. He suggests that as the cortical brain potentials are increased in rate and amplitude after acute anoxia, there is neuronic stimulation either during the early stages of decreased oxidation or "on the rebound" after it; hypoglycæmia acts much like hypoxia on the function of the brain, leading to this secondary "overshooting" with increased activity which may be the basis of the therapeutic action. Gerard would attribute the improvement in the schizophrenic to the increase in the respiration of his brain which may be so caused, and points to the findings of Kerr and of Ghantus[5] that the neurological complications of hypoglycæmia correspond less to the hypoglycæmia in the blood than to the glycogen content in the brain.

That there are difficulties in the way of accepting cerebral anoxia as the common feature in Cardiazol, insulin and other physical methods of treating schizophrenia may be seen from the study by Stone[6] of the effect of various drugs upon the lactic-acid content of the brain in mice. These small animals were chosen because they could be plunged into liquid air and frozen instantaneously without the anæsthetics and surgical procedures, or the post-mortem changes, which would interfere with accurate estimation. Stone found that during insulin convulsions the amount of lactic acid in the brain is significantly decreased, and that a similar decrease sometimes takes place during severe insulin hypoglycæmia without convulsions; a decrease also occurs during anæsthesia. If convulsions are induced with cardiazol, however, the lactic-acid value in the brain remains normal or is significantly increased; picrotoxin produces an increase, too, above the level that can be attained in normal mice after strenuous exercise, and in cyanide convulsions the increase is large. But during nicotine convulsions there is no significant alteration in the amount of lactic acid in the brain.

These striking differences between the effects of common convulsants and those of anæsthetics or hypoglycæmia deserve attention. Although the mechanism of glucose katabolism in the brain is still obscure, certainly an alteration in lactic-acid content in one direction is not easily made compatible with the view that much the same disturbance of oxidative activity in the brain is taking place then as when the lactic-acid change is in the opposite direction. Stone's findings also run counter to Quastel's[7] hypothesis that the anæsthetic action of drugs—as employed in the continuous narcosis method of treatment of psychoses—is due to specific inhibition of some part of an enzyme system concerned in the oxidation of carbohydrate products, such as lactate; if that were so, one would expect an increased lactate content during anæsthesia, whereas Stone found it to be lowered.

Stone discusses various hypotheses to account for his observations, such as that the lactic-acid content is dependent on the activity of the tissue, being highest during convulsions; or that analeptics inhibit some part of an enzyme system, as in Quastel's explanation of the action of anæsthetics, but the readings obtained for nicotine convulsions are not consonant with either of these hypotheses. Since, moreover, normal or low readings for lactic acid in the brain were obtained in conditions, such as ether anæsthesia and insulin convulsions, in which there is a high proportion of lactic acid in the blood, it is presumably not from the blood that the extra lactic acid in the brain during picrotoxin or cardiazol convulsions is derived. Stone mentions the possibility that in the latter two conditions the high values may be due to circulatory disturbances resulting in cerebral anoxæmia: this would leave unexplained the readings in hypoglycæmia. It is evident that cerebral metabolism is a field for active research in psychiatry as well as in physiology.

5. Kerr, S. E., and Ghantus, M., *J. biol. Chem.* 1936, **9**, 116.
6. Stone, W. E., *Biochem J.* 1938, **32**, 1908.
7. Quastel, J. H., and Wheatley, A. H. M., *Ibid*, 1934, **28**, 1521.

SURGERY OF GALL-BLADDER AND BILE-DUCTS

THE history of the surgery of an organ is not only of interest in itself, but in addition it frequently conveys valuable lessons which, by analogy, can be applied in other directions. With this in mind, Prof. Grey Turner opened his Lettsomian lectures[1] on the surgery of the gall-bladder and bile-ducts with a survey of the history of the subject. The later phases in the development of the surgery of the bile-passages are made particularly interesting by the author's personal knowledge of many of the pioneers. With an experience of 1040 operations on the gall-bladder and bile-ducts to his credit, Grey Turner's opinions necessarily carry much weight. Having lived and operated throughout the period of the great "cholecystectomy versus cholecystostomy" controversy, such an experienced operator still has occasion sometimes to employ the latter operation. His warning quotation from a friend that "a living problem is better than a dead certainty" might well be taken to heart by the type of surgeon who sets out to remove the gall-bladder at all costs, and whose skill is sometimes no better than his judgment.

It is a surprise to find Professor Turner stating that in his experience cholecystitis apart from gallstones is an uncommon disease in this country. It is not clear with what diagnosis he would label the large number of patients with flatulent dyspepsia, tender gall-bladder, positive cholecystographic evidence, and possibly infection of bile taken from the duodenum. There is still considerable controversy as to whether the acutely inflamed gall-bladder should be operated on as a matter of urgency or should be allowed, if it will, to subside before operation is undertaken. Professor Turner is on the side of early operation, but advocates simple drainage in preference to removal. His reasons are the added risks of bleeding, the increased danger of injury to the ducts and the possibility of later sclerosis of the common duct, if cholecystectomy is carried out in the presence of acute inflammatory changes. It is a compliment to the sound judgment and careful presentation of facts in these lectures, that one regrets what is not there. In particular we should have welcomed the author's views on the many pathological and clinical problems associated with cholesterosis, but on this matter he has contented himself with a brief reference to the uncertainty of the results of cholecystectomy for "strawberry gall-bladder."

1. Turner, C. Grey, *Proc. Med. Soc. Lond.* 1939.

A "France" pension of £30 per annum will be filled shortly by the council of Epsom College. Candidates must be fully qualified medical men of not less than 55 years of age, whose income, independently of any allowance from the Royal Medical Benevolent Fund, does not exceed £100 a year, if single, and £150 if married. Two or more St. Anne's scholars will also be elected by the council. Candidates must be fully 9 years of age, and must be orphan daughters of medical men who have been in independent practice in England or Wales for not less than 5 years. The value of each scholarship is dependent upon the means of the applicant and the locality and fees of the school selected. Forms of application for the pension and scholarships may be had from the secretary of the college, 49, Bedford Square, London, W.C.1, and must be completed and returned by Oct. 15.

SPECIAL ARTICLES

ADMINISTRATION OF FLUIDS TO SURGICAL PATIENTS*

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IN order to formulate simple rules for the administration of fluids and sodium chloride, intravenously or per rectum, a study of the problems of fluid balance has been carried out in the wards of the surgical professorial unit at St. Bartholomew's Hospital during the past three years. It has been found possible to eliminate entirely postoperative dehydration and œdema, even with such complications as intestinal obstruction, or paralytic ileus, and the increased comfort and smooth convalescence of all patients requiring parenteral fluids has been particularly gratifying.

It must be emphasised that fluids are always given by mouth after surgical operations unless there are contra-indications. If, owing to nausea or post-operative vomiting, adequate oral intake is not possible, this is supplemented by fluids given per rectum, or occasionally, intravenously. After all operations on the gut, fluids by mouth are withheld for 24–48 hours or longer. This routine diminishes the incidence of postoperative distension and paralytic ileus and may limit the spread of infection in the peritoneal cavity. In such cases the method of choice is the administration of fluids per rectum, but this is inadvisable after operations on the rectum or distal colon and intravenous therapy is then required.

Much has been learnt in recent years about the normal water balance of the body, and its application to surgical patients is due largely to Coller and Maddock (1934–37) who demonstrated the quantity of fluids required by patients after operation, and for the control of dehydration. They have shown that a sick surgical patient requires at least 3600 c.cm. of fluid a day.

The fluid-loss of a normal person is approximately as follows (Starling 1936):

Urine	1500 c.cm.
Skin	600 c.cm.
Lungs	400 c.cm.
Fæces	100 c.cm.
	2600 c.cm.

It is not sufficiently realised that a normal person loses nearly 1000 c.cm. of water daily by *insensible* perspiration from the skin and as water vapour with expired air. There is commonly profuse sweating during and after a general anæsthetic or a prolonged operation, which greatly increases the fluid loss. There is no record of this normal fluid loss on the temperature chart and it is commonly overlooked. On no account must the urine output be considered as a true index of the water-loss of the body, for the skin and lungs, intestines (diarrhœa and vomiting), tissues (œdema), all have first call on the available water. With the water that remains, the kidneys must excrete the waste products of the body, amounting to about 35 g. a day. Even when the kidneys are concentrating urine to a specific gravity of 1032, 500 c.cm. of water is needed (Lashmet and Newburgh 1937). A damaged kidney able to concentrate only to 1010 will need 1500 c.cm. to excrete the normal waste products, and if this is not available nitrogenous retention will occur.

To allow for the increased loss of fluid by sweating a patient should receive at least 3600 c.cm. of fluids in the 24 hours after a major operation. On the following days 3000 c.cm. is usually sufficient. It may be thought that such a fluid-intake is never achieved by healthy people, but it must be remembered that the water contents of solid foods contribute over 800 c.cm. and the water of oxidation a further 350 c.cm.

In the past many patients have been fortunate if they have received half this quantity, and a negative fluid-balance was inevitable. Even moderate restriction of fluid is badly borne by healthy people, and much more so by patients who have had a major surgical operation. Although morphia may allay much discomfort, dehydration, with its many risks is a serious burden for a critically ill patient, and must materially affect the prognosis.

Not only have many patients received too little fluid, but they have often been given too much salt. The basic need of the body is only 1–2 grammes a day (Falconer and Lyall 1937) and a normal diet may contain 5–10 g., but 5 g. is probably a sufficient allowance. If a surgical patient is given his correct postoperative fluid allowance (3600 c.cm.) as isotonic normal saline, he will receive as much as 32 g. in the 24 hours, and may have difficulty in excreting this amount. This has been shown by determining the chloride excretion in the urine (Avery Jones and Naunton Morgan 1938). It was shown by Baird and Haldane (1922) that 35–40 g. of sodium chloride taken in a day by a healthy man caused visible œdema. The sodium chloride retains water in the tissues, and there may be an increase in blood-volume as shown by a fall in the hæmoglobin percentage. The associated fall in plasma proteins is dangerous, for this facilitates the retention of water in the tissues and the production of œdema, which may hinder the healing of wounds or may waterlog the lungs. These risks have been emphasised by Maddock and Coller (1934), Maizels and Smith (1934), Walther (1937), Falconer and Lyall (1937), and Bartlett, Bingham and Pedersen (1938).

The regime recommended is to give dilute saline so that the uncomplicated case will receive about 5 g. of sodium chloride a day. When giving rectal fluids, one volume of normal saline to four volumes of tap water is used; for intravenous injection, one volume of normal saline to four volumes of 5 per cent. (isotonic) glucose in distilled water.

In addition to this basic allowance of fluid, extra normal saline is given to cover exactly any loss of intestinal fluid or blood. If the patient has vomited 1000 c.cm. then he is given 1000 c.cm. of normal saline in addition to his daily allowance of dilute saline. This principle of replacing lost intestinal fluid by normal saline has also recently been advocated by Bartlett, Bingham and Pedersen (1938), who also have found it successful.

SOLUTIONS USED

0·18 per cent. sodium chloride (one part of normal saline to four parts of tap water).—This solution is given per rectum as a continuous drip (60 drops per minute, using a No. 6 rubber catheter), and it is usually

* Based on a full report published in *St. Bartholomew's Hospital Reports*, 1938.

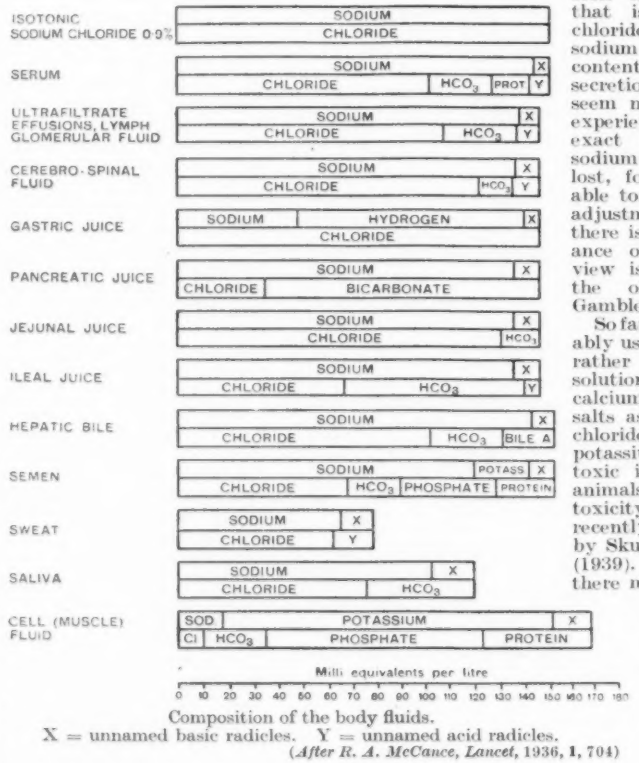
retained very well. It is uncommon to give less than 3000 c.cm. in twenty-four hours, and we have given as much as 6000 c.cm.

4 per cent. glucose, 0·18 per cent. sodium chloride (one part of normal saline to four parts of 5 per cent. glucose in distilled water).—This solution is isotonic and is given intravenously as a continuous drip. At the rate of 3000 c.cm. a day, it supplies 120 g. of glucose and 5·4 g. of sodium chloride. The tendency to thrombosis of the vein is perhaps greater than with normal saline; it is usually necessary to change the vein after forty-eight hours, but the same vein has been used for as long as five days. The solution may be given per rectum, but we have found that it is not so well retained as the saline diluted with tap water.

0·9 per cent. sodium chloride (normal saline).—This solution may be given intravenously, but it is not as well retained when given per rectum as 1/5 normal saline. Its indications are:

1. Volume for volume to replace any lost intestinal fluid.
2. To replace blood loss, if a blood transfusion is not given.
3. To be given if there is severe shock, while waiting for a blood transfusion.

Hypertonic saline has a limited application, for in surgical patients there is never loss of salt without loss of water. Both can be replaced by normal saline. Hypertonic saline, however, is of value in cases of established paralytic ileus, where there may be considerable stagnation of fluid in the dilated loops of intestine. Three hundred c.cm. of 5 per cent. sodium chloride may be given in order to reverse the flow of secretions and return fluid from the gut into the blood.



Composition of the body fluids.
X = unnamed basic radicles. Y = unnamed acid radicles.
(*After R. A. McCance, Lancet*, 1936, **1**, 704)

It will be observed that we do not use the common 5 per cent. dextrose in normal saline. This is hypertonic, and contains too much salt for routine use. It must be added that whenever possible, intestinal secretions should be returned to the intestine—e.g. bile from a fistula, or from drainage of gall-bladder, should be returned to the stomach through a Ryle's tube or nasal catheter.

Using these simple rules during the past two years, it has been found possible to keep the blood chemistry practically within normal limits, even when there has been continuous gastric drainage for as long as nine days. The patients have not shown evidence of dehydration, and have not suffered from thirst.

Male aged 46.—Partial gastrectomy for gastric ulceration. He vomited 1600 c.cm. the third day after operation. A Ryle's tube was passed into the stomach and continuous suction begun with a Wangensteen apparatus. A few days later the drainage was stopped, but vomiting recurred and radiography showed a much dilated duodenal loop and barium did not pass into the jejunum. An entero-anastomosis was performed and convalescence was subsequently uninterrupted.

Aspirated gastric contents, or vomitus, may contain as much as or more sodium than is present in blood. Bartlett (1938) and his co-workers found an average concentration of 5·7 g. of sodium chloride per litre in one hundred 24-hour specimens of gastroduodenal drainage. Since sodium is the main base of the extracellular fluids, when it is lost from the body, there must be a reduction in the volume of these fluids. This dehydration cannot be repaired by water alone, for this could not be retained in the tissues without profoundly upsetting the osmotic pressure. Sodium must be given in addition. It will be seen from the table that isotonic sodium chloride will cover the sodium and chloride content of any intestinal secretion. It does not seem necessary in our experience to give the exact proportions of sodium and chloride lost, for the body is able to make its own adjustments provided there is a liberal allowance of water. This view is confirmed by the observations of Gamble (1929).

So far we have invariably used normal saline rather than Ringer's solution, which contains calcium and potassium salts as well as sodium chloride. Intravenous potassium is extremely toxic in experimental animals and its possible toxicity in man has recently been reviewed by Skudder and others (1939). In any case there may be a moderate allowance of potassium from the body proteins which are broken down when intravenous or rectal fluids are given, for it is impossible to give proteins by these routes. Again, the stores of calcium in the body are so large and labile that it hardly seems necessary for a few days to add the small amount in Ringer's solution. These are, however, theoretical points, and there seems scope for further biochemical investigation. Using isotonic glucose and isotonic saline in varying proportions has the advantage of simplicity.

It should be noted however that Falconer (1939) has reported favourably on the use of Ringer's solution in established cases of dehydration, and its use has also been advocated by Graham (1937).

Intravenous therapy is at present a very incomplete diet, and should not be continued longer than absolutely necessary.

MANAGEMENT OF CASES COMPLICATED BY ABNORMAL FLUID LOSS

It is essential to record the fluid intake and loss on the temperature chart, so that the fluid balance can be seen at a glance. Daily estimation of the

Days	1 Op.	2	3	4	5	6	7	8	9	10 Op.	11	12	13	14	15
Fluid intake—															
By mouth	..	..	450	2040	..	420	..	970	990	..	..	465	1440	..	..
Per rectum :															
N/5 saline	3000	3000	3000	..	..	..	..	..	..	..	..	..	..	..	..
N. saline	..	..	..	1500	..	..	..	..	..	..	..	..	..	..	..
Intravenously :															
4 per cent. dextrose in 0·18 per cent. NaCl	..	..	..	..	2000	2150	2500	2500	1500	3200	3000	3300	2000	..	..
N. saline	..	..	..	..	650	400	1450	550	1030	..	..	..	..	..	..
Fluid loss—															
Vomit	..	..	..	1600	..	..	..	..	450	..	..	..	..	..	..
Gastric drainage	..	..	..	..	550	500	1350	600	690	..	..	..	..	..	..
Urine	..	700	1500	2350	1000	700	750	1150	1850	450	850	1350	1300	..	..
Blood—															
Blood-urea mg. per 100 c.cm.	..	..	35	..	..	54	..	40	..	32	..	47	..	25	..
Alkali reserve, Vols. CO_2 per 100 c.cm.	..	..	58·7	..	..	60·4	..	67·0	..	61·7	..	55·5	..	60·4	..
Plasma chlorides, mg. NaCl per 100 c.cm.	..	..	588	..	..	611	..	595	..	597	..	559	..	582	..

Op.=Operation.

hæmoglobin percentage is of great value in all difficult cases. If there is concentration of the blood as with dehydration, the hæmoglobin will rise; if there is hydræmia due to retention of excess sodium chloride, there will be a corresponding fall in the percentage of hæmoglobin. Of course, blood lost at the operation will cause a fall at the rate of 12 per cent. for every 600 c.cm. of blood.

The simplest test on the urine is for chlorides. If absent, the intake of sodium chloride may be increased, but this is seldom necessary on this regime. If a patient is having an adequate intake of sodium chloride, a sudden decrease in the output of chloride may herald postoperative distension and paralytic ileus, for there may be accumulation of intestinal fluids rich in chlorides within the distended gut. Whether or not chlorides are present in the urine depends on the chloride intake, and it must be remembered that a patient having water alone may have a normal convalescence although chlorides are absent from the urine for five to ten days. In a patient with ileus, the presence of chlorides in the urine is particularly reassuring to the surgeon. It means, of course, that treatment has restored the plasma chlorides to their normal level. In difficult cases it is of value to have a daily determination of the blood-urea. If it rises above 60 mg. per 100 c.cm., the fluid intake should be increased and the plasma chlorides and alkali reserve determined.

The intelligent administration of fluids after operation adds much to the comfort of the patient, and may favourably influence the prognosis. The underlying principles are simple, and if followed, even in difficult cases, there is seldom need for elaborate biochemical control of the blood.

The following routines have been established.

1. *After an operation on the stomach, or small intestine or when peritonitis is present.*—First day: nothing by mouth; morphia gr. 1/6 or heroin gr. 1/12 six hourly; 3600 c.cm. 1/5 normal saline in tap-water per rectum. Second day: 3000 c.cm. per rectum. Third day: if peristalsis is audible, fluids by mouth, 600 c.cm. and 2400 c.cm. per rectum. Fourth day: fluids by mouth.

2. *After an operation complicated by vomiting* (e.g. with acute dilatation of the stomach, vicious-circle vomiting).—Pass nasal catheter through nose into stomach, and establish continuous drainage with a Wangersteen apparatus. Start intravenous drip, giving 3000 c.cm. 4 per cent. dextrose, 0·18 per cent. NaCl (one part of normal saline to four parts of 5 per cent. dextrose). In addition, give normal saline in equal volume to the fluid withdrawn from the stomach. This volume should be retrospective to the time the vomiting began.

3. *After an operation such as excision of rectum or colon, when rectal fluids cannot be given, or retained.*—Give intravenous fluids for two days. If a blood transfusion has not been given, give 600 c.cm. of normal saline to cover blood lost, followed by 3600 c.cm. 4 per cent. dextrose, 0·18 per cent. NaCl and, 3000 c.cm. the following day.

4. *In a patient with established dehydration.*—It has been shown by Coller and Maddock that patients who already show signs of dehydration have lost at least 6 per cent. of their body-weight; a patient weighing 10 st. has lost 3900 c.cm. The patient must receive this allowance of normal saline plus the usual daily fluid intake. In a patient who is dehydrated from loss of saliva and diminished fluid intake, as in a carcinoma of the œsophagus, it is sufficient to give half normal saline. This is true also in cases of pyloric stenosis.

Our thanks are due to Prof. J. Paterson Ross in whose wards this work has been carried out, and to Dr. G. Graham and Prof. R. V. Christie for their advice in the preparation of the paper.

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"... A modern industrial and democratic society, by reason of its economic complexity, cannot suffer itself to become anarchical. If it is not permitted to develop creatively into a Christian society it must become a totalitarian tyranny."—From "The Price of Leadership," by J. MIDDLETON MURRY, London, 1939. Quoted in *Nature, Lond.* Aug. 26, p. 345.

THIRD INTERNATIONAL NEUROLOGICAL CONGRESS

THIS congress was held at Copenhagen from Aug. 21 to Aug. 25 under the presidency of Dr. Christiansen. Earlier in the summer there was some question of postponing the congress in view of the uncertain international situation, but it was finally decided to hold the congress as originally arranged. Crises considered, the attendance at the congress was remarkably good, although the contingent from Great Britain was smaller than it would have been in more settled times; it was however led by the president of the previous congress, Dr. Gordon Holmes.

The congress sessions were held in the University of Copenhagen and the opening was performed in the presence of H.M. the King of Denmark and Iceland. The morning of the first day was devoted to a discussion on the *endocrine-vegetative system* with reference to neurology. Sir Henry Dale gave an account of the chemical transmission of the nerve impulse in the sympathetic and parasympathetic systems and at the end-plates of motor nerves. J. F. Fulton discussed the relationship between the endocrine glands and the vegetative nervous system. He mentioned the nervous connexion between the hypothalamus and the pituitary; through the pituitary hormones both thyroid and ovaries are also under the control of the central nervous system. He developed the theme of varying levels in the nervous system for the integration of autonomic reflexes, the degree of complexity of the integration increasing at the more rostral levels; both the hypothalamic and cerebral cortex levels had important rôles in the control of the endocrines. Laruelle of Brussels showed a series of beautiful histological preparations of the parts of the central nervous system which are anatomically connected with the autonomic system. Further papers on related subjects were given by Gagel from Breslau and Forsberg from Oslo. The afternoon was given over to short papers which had some connexion with the morning's theme, the most interesting being Macdonald Critchley's on disorders of nocturnal sleep in narcoleptics, in which he added to the classical description of the narcolepsy-cataplexy syndrome a number of minor phenomena including feelings of semi-paralysis and hypnogogic hallucinations. Symptoms of these types suggested that narcolepsy is a total disorganisation of the physiological mechanism of sleep.

The discussion on the second day was on a subject of less general interest to British neurologists, that of the *heredo-familial diseases*, especially from the genetic aspect. The principal papers were by Bernard Sachs (this paper was read by Riley) on the relationship between amaurotic family idiocy and the other disorders of lipoid metabolism such as Niemann-Pick disease; by André Thomas of Paris on the hereditary cerebellar atrophies; by Curtius of Berlin and the Rumanians, Jonesco-Sisesti and Stroesco, on the genetic aspects of the problem; and by Schaffer of Budapest on the general pathology of hereditary nervous disease. A film of congenital myotonia in goats was shown by G. L. Brown and A. M. Harvey from the Medical Research Council's institute at Hampstead and they also showed myograms demonstrating that the myotonic response to percussion persisted after complete denervation of the muscle and after curarisation; this indicated that myotonia was a property of the muscle-fibres themselves. A short paper which was based on a family studied at the National Hospital, Queen Square, demonstrating that certain cases diagnosed in infancy as Oppenheim's disease were in reality examples of a congenital myopathy was read by J. W. Aldren Turner.

There were no scientific discussions on the Wednesday, as the day was given over to expeditions to Elsinore and other places of interest in North Zeeland. On this day most of the British participants in the congress had to return to England for reasons connected more with psychiatry than neurology, and the account of the last two days of the congress is therefore not at first hand.

On the fourth day the congress divided into six sections concentrating on varying unrelated aspects of neurology. In a paper on the *pathology of the cerebral astrocytomas*, Scherer of Antwerp pointed out the frequency with which parts of the tumours showed the structure of glioblastomas, a phenomenon which he did not think bore any relationship to the age of the tumour or to surgical intervention. In the therapy section there was a communication by Madelaine Brown and J. H. Talbott from Boston on the value of *potassium salts in Menière's syndrome*; they reported that several patients who had received no benefit from dehydration had benefited considerably from a high intake of potassium; since this form of treatment had been started at the Massachusetts General Hospital surgical intervention for Menière's syndrome had not been required.

In the section devoted to epilepsy, Lennox read a paper on the *electro-encephalographic records of relatives of epileptics*. In a group of 110 parents or siblings of epileptics he found abnormal records in 51 per cent.; this was nine times the incidence of abnormality in a normal control group. In 34 families both parents were examined and in 91 per cent. at least one of the parents showed a definitely abnormal record. He concluded that electro-encephalography was a practical aid in the control of epilepsy by means of eugenics. A further paper by Lennox, on the *use of diphenyl hydantoin in epilepsy*, was based on the work of Merritt and Putnam from Boston; they concluded that it was of considerable value in cases of grand mal and psychomotor seizures which were not relieved by phenobarbitone, and, surprisingly enough, found that few patients were intolerant and no serious complications had occurred.

In the neurological surgery section papers were given by Mixter on *rupture of the lower lumbar intervertebral discs*, by Oljenick on *occipisation of the atlas and its clinical syndrome* and by Olivecrona on the *treatment of acoustic neuromas*.

The last day was given over to a symposium on neurological results of the *avitaminoses* especially in the peripheral nervous system. The rôle of vitamin-B_1-lack in the ætiology of polyneuritis, and of nicotinic acid in the production of pellagra were the subjects most discussed. Wechsler from New York gave a comprehensive account of the relationship between B_1-deficiency and peripheral neuritis; he objected to the word neuritis on the ground that there was no evidence of inflammation; instead he wished to introduce the term polyneuropathy for polyneuritis in which vitamin-lack or any other non-infective agent seemed to be responsible. He placed a large and mixed collection of types of polyneuritis in the deficiency class; thus he thought that neuritis associated with arsenic, diabetes and even phosphorus might have avitaminosis as an additional and possibly ultimately determining factor. He suggested that not only B_1 but the rest of the B complex, and even vitamins A, C, and D might be of importance for the nutrition of the central and peripheral nervous system. Ungley's paper described a number of cases

of polyneuritis, some of them associated with gastro-intestinal lesions, which appeared to be due to deficiency of vitamin B, while Teglbjaerg from Denmark discussed the treatment of nervous disease with vitamins; he pointed out that chronic nervous changes may result from avitaminosis, but are irreversible in spite of treatment with large doses of the essential vitamins.

Sir Edward Mellanby's communication dealt especially with the effects of lack of vitamin A on the nervous system; many of the degenerative lesions found both in the spinal cord and peripheral nerves in experimental animals, which were previously thought to be due specifically to lack of the vitamin, were in fact due to overgrowth of bone causing pressure on the nerves and cord. It had not been decided yet whether this bony overgrowth was the only factor causing the changes in the nervous system. Unfortunately an important paper from the Oxford school by H. M. Sinclair could not be given. This worker has tried to get objective evidence of vitamin-B_1-lack in neurological conditions by estimating the amounts present in the blood both of total vitamin B_1 and of its phosphorylated form or cocarboxylase. Such work is a valuable addition to clinical studies on the subject.

As well as the scientific discussions, there were the usual social accompaniments of a medical congress, including an evening reception given by the city of Copenhagen in the town-hall.

THE BASTARDY (BLOOD TESTS) BILL

REPORT OF THE SELECT COMMITTEE OF THE HOUSE OF LORDS

LAST December Lord Merthyr introduced in the House of Lords a bill to enable courts of summary jurisdiction to order blood-tests to be made in bastardy cases. The bill provided that when either party demanded a blood-test the court should be obliged to order it, and that if the woman refused her application should be dismissed. The test should be done by a registered medical practitioner approved by the Lord Chancellor. To save expense his report should be admitted as evidence of the facts contained in it, but he could be called as a witness by the court or either party. Whether the man was excluded by the result of the test from suspicion of paternity or not, the report should be before the court; but if it was inconclusive, no comment on it should be allowed. In the discretion of the court, costs should be payable out of the funds which are at the disposal of local authorities for the defence of poor prisoners. The Lord Chancellor would be given power to make rules governing the whole of the legal and serological procedure, and he would be assisted in this task by an expert advisory body consisting of legal and medical members.

The bill was given a second reading in February and was referred to a select committee of the Lords. This is often done when a bill contains new and controversial proposals. The committee is usually eight or ten strong and has power to summon witnesses; it is assisted by the legal advisers of the Government. The present committee was presided over by Lord Strathcona and Mount Royal, and included in its personnel Viscount Dawson of Penn and the Bishop of Salisbury. The committee held several sittings during the summer and examined magistrates, barristers, solicitors, pathologists and others. Its report was published on Aug. 18.

NEED FOR THE TESTS

The committee declared that it was unanimously of opinion that the qualities of blood underlying blood grouping, and the laws of inheritance governing the transmission of these qualities from parents to children, are accepted by such a consensus of scientific opinion throughout the civilised world as to render it desirable in the interests of justice for this knowledge to be applicable to affiliation cases. It made certain amendments in the bill as originally drafted, and recommended that the amended bill should be passed into law. Although the tests can only exclude paternity in about one case in three where the man is innocent, the committee agreed with the Home Office that nevertheless the tests might prevent an injustice being done in these cases, and any method which reduces the number of cases in which the courts may make mistakes must be welcomed. The committee was satisfied that the risk of error in the making of blood-tests has been reduced to negligible proportions, and that the tests not only might but would prevent injustice. It noted that the public are becoming ready to accept the positive verdict of science when it declares that a man cannot be the father of a particular child.

The committee was much impressed by the fact that the preponderance of medical and legal opinion was emphatically in favour of the use of blood-tests as evidence in affiliation cases; also that the testimony of two out of three critics of the bill, though of value and interest as regards bastardy law in general, was not directed against the validity of blood-tests as evidence and was largely irrelevant to the purpose of the bill. Mr. Dunne, a stipendiary magistrate, who was strongly in sympathy with the main object of the bill, urged that these are civil cases and that to make it mandatory on the court to order a blood-test would be an interference with "the liberty of the subject"; and that a mother would have some justification for objecting to the taking of blood either from herself or from her child. The committee felt that although these cases are technically civil, yet they require special treatment in view of the social repercussions and possible injury to reputation they involve. It did not think that too much weight should be attached to the suggested interference with "the liberty of the subject" if the tests can be carried out under conditions which would admit of no doubt as to the validity of the results. An attempt was made by two non-medical witnesses, representing the National Council for the Unmarried Mother and Her Child, to prove that science is not yet sufficiently advanced to justify the use of blood-tests in court. The committee was more impressed by the unanimously favourable testimony of the eminent pathologists who gave evidence, and saw no alternative to accepting the conclusion that blood-tests carried out by approved experts would render reliable and valuable assistance to the courts in affiliation cases.

LEGAL PROBLEMS OF THE BILL

The committee concluded that when a blood-test is demanded by the man, the court should be obliged to order it, and that in other cases it should have discretion to do so. It had also to consider whether there should be any exceptions to the rule that the refusal of the woman should bring about the dismissal of her application. As the responsibility of taking the blood samples would invariably rest with a qualified medical practitioner, they concluded that no cognisance need be taken of the very exceptional

cases, such as the presence of hæmophilia, in which the taking of blood might be detrimental to health.

If the bill became law it would not be of much use unless it made some provision for paying the expenses out of public funds, for most of the parties are poor. Certain witnesses pointed out that to impose such costs upon the local funds would not only be a burden on the rates, to which the county councils strongly object, but would also introduce an extension of legal practice. The balance of the evidence was, however, in favour of the charge being imposed on the local funds, and with this view the committee was in complete agreement. It dealt at some length in the report with the probable cost of blood-tests, and did not think it likely that the cost to a local authority in any one year could amount to more than £170—an insignificant amount in view of the large funds handled by these bodies. There would also, it remarked, be some saving to public funds in a reduction of the number of poor defendants sent to prison for default. It might justly have suggested that the existence in law of the bill would probably cause a considerable reduction in the number of bastardy applications.

The committee therefore decided that blood-tests, within their own domain, should be sufficient evidence of the facts shown thereby, unless the pathologist should have attended the court at the instance of the court or of a party, in which case he would be liable to cross-examination. The court should have discretion to demand security for costs, and to order the payment by either party or out of the local funds of the costs not only of the test but also of the attendance in court of the pathologist. These provisions were in the bill as drafted.

DETAILS OF PROCEDURE

A very difficult practical problem with which the committee was confronted was the question of the rules to be made by the Lord Chancellor governing the procedure and the composition of the advisory body. The committee considered different suggestions for the composition of this body, made by Mr. D. H. Kitchin, Dr. G. Roche Lynch and Dr. S. C. Dyke. It concluded that Mr. Kitchin's was the best and, subject to the agreement of the Lord Chancellor, recommended that it be adopted. This plan provides for a board consisting of ten members, five legal and five medical, the legal members to be nominated by the Lord Chancellor and the professional bodies, and the medical members by the three Royal Colleges, the Medical Research Council and the British Medical Association. A set of suggested draft rules was submitted to the committee and is appended to its proceedings: these contain a detailed scheme for the approval of pathologists and testing centres and for the taking, testing and identification of samples.

The committee recommended that there should be two approved testing centres with the prospect of increasing them to four if required. Provision should be made for blood samples to be taken by a registered medical practitioner, who should if possible be the woman's regular medical attendant. It recommended that the court should not have power to order a new test, but that on appeal the court of quarter sessions, though not a divisional court or other appellate court, should have power both to take into account the test produced to the lower court and to order a second test if it thinks fit. This power for quarter sessions to order a test is a valuable addition to the bill as drafted, but its denial to the divisional court is rather puzzling; the judges of the King's Bench Division would be hardly likely to misuse it. The question was raised whether in any circumstances the approved person should be compelled to submit his test to another pathologist for confirmation. It was pointed out that this compulsion might give rise to doubts as to the validity of tests in general. The committee was satisfied that a single test is sufficient and that it is unnecessary to impose confirmation as a duty.

The committee accepted the opinion of the majority of the pathologists that the blood samples should be forwarded untreated and not diluted with a preservative. It was satisfied that a standardised system of identification by means of coloured test-tubes would make the risk of error negligible, and that samples sent by post in strong wooden containers would arrive in good condition. Finally, it recommended that the child and its mother should always be required to appear together to undergo the test.

HEALTH IN FACTORIES

FACTORY work is, thanks to sane industrial legislation, becoming steadily more safe. Dr. J. C. Bridge, senior medical inspector of the Home Office, has a similar story to tell with regard to the health of the factory worker in his section of the annual report of the Chief Inspector of Factories [1] for 1938. Parts of the Factories Act, 1937, deal with general health, and employers have been very willing to conform with them.

The eye-protection provisions have been greatly extended but the cry still goes up that workers refuse to wear goggles. In one large ophthalmic hospital in London the education of workers is attempted by an exhibition of eye-protection appliances; it seems unfortunate that the lesson should be learned only after an eye injury has occurred.

The number of cases of *lead poisoning* has fallen from 141 in 1937 to 96 in 1938; whereas in 1900 the number was well over 1000, it is now for the first time under 100, in spite of the fact that since 1927 building-painters have been included in the figures. It was sometimes found that lead paint was being applied by means of a spray, but after the danger was pointed out the brush method was substituted. Leadless paints also are being used more and more. Two cases of *mercurial poisoning* were reported, one in a thermometer-maker and the other in an electric-metermaker.

Of the nine cases of *aniline poisoning* four were unusually severe (aniline oil caused two of them, paranitrochlorbenzol vapour the third and paratoluidine for the fourth). The remaining five cases were slight and were brought about by contact with trinitrotoluol in a shell-filling factory. No cases of chronic *benzene poisoning* were reported during the year, but investigation of a boy with leucopenia engaged as a cellulose sprayer showed that he had been using for 14 weeks two cellulose solutions, one of which contained toluene and the other 30 per cent. of benzene.

Toxic jaundice is a portmanteau term; of the four cases notified during the year three occurred in a chemical works and were due to arseniuretted hydrogen and the fourth was caused by trinitrotoluene in a shell-filling factory. One of these cases of arsine poisoning presented a difficult problem; apart from a slight lemon-yellow tinge of the skin of the face, there was no evidence of jaundice, and death occurred within two days of exposure, as compared with the usual average of five days. Dr. Bridge remarks that

1. Cmd. 6081. H.M. Stationery Office. Pp. 133. 1939. 2*s*.

he had not previously seen arseniuretted hydrogen poisoning without definite jaundice, but the post-mortem examination, which was not performed until five days after death, revealed no sign of decomposition; the cheeks and nose were bright pink in colour and arsenic was detected chemically in the various organs. Three other fatal cases of jaundice were investigated and in these there had been exposure to fumes from chlorinated naphthalene wax, a substance which is known to cause a skin affection called "wax rash" or "chlor-acne." Two of the fatal cases had this condition as well as jaundice. The third, a girl aged 21, had been employed at a radio works for nine months, three feet away from where the wax was being melted in small shallow electrically heated trays. Slight malaise for two weeks preceded the onset of jaundice. After treatment at home for a fortnight she was removed to hospital where she died two days after admission. Of 6 other women who worked in the same department, 2 were found to have suffered from jaundice, and 3 others complained of nausea, dizziness and drowsiness. Blood-tests to exclude Weil's disease were in each case negative. The precautionary measures to suppress the fume consisted in regulating the temperature of the wax-pots, covering them, and applying exhaust ventilation.

An increase in *anthrax* occurred during 1938, there being 34 cases with 5 deaths as compared with 23 with 4 deaths in 1937. Dr. Bridge comments that a satisfactory method of disinfection of hides and skins is yet to be found. The dust from wool (shoddy) is used as a soil-fertilizer, and one case of anthrax occurred in a factory where shoddy was handled; in another factory where two cases occurred, the only possible source was found to be bone-meal obtained by grinding in India of sun-dried and unsterilised bone. Another case occurred in a builder's labourer, employed in mixing mortar with hair from goat-skins fellmongered in this country and therefore not coming under the Order in Council as regards disinfection. In the five fatal cases treatment was delayed by failure to obtain medical attention or in correct diagnosis, and Dr. Bridge emphasises the value of supplying workers in dangerous processes with the small official anthrax card (Form 1893). This card is shown by the worker to his doctor, who is thus reminded to think of anthrax and delay in treatment is thereby prevented.

An increase in *chrome ulceration* (115 in 1938, 14 more than in 1937) took place thanks to the use of anodic oxidation in aircraft production. *Occupational cancer* still continues. Pitch and tar were the carcinogenic agents in 103 cases, with 8 deaths, and paraffin or shale oil in 62 cases, with 13 deaths. Of the pitch and tar cases, 23 came from patent fuel works, 57 from tar-distilling plants, 11 from gasworks, and 12 from other industries; the majority (58) of the mineral-oil cases occurred in cotton mule-spinning and only 4 in other industries. At a nickel works 4 more cases of cancer have occurred, 2 of the nose and 2 of the lung.

Most of the reported cases of *gassing* were due to carbon monoxide. Men working with blast furnaces tend apparently to take unnecessary risks; in 10 cases, of which 5 were fatal, gassing took place during attempted rescue of others.

There were 430 deaths from *silicosis* and 9 from *asbestosis* in 1938. Efforts are being made to find efficient substitutes. Examples include the use of alumina for flint in china-bedding and for siliceous material in the parting powders used in foundries; of non-siliceous abrasives for sand or flint in blasting; and of non-siliceous material for kieselguhr (used in the slow cooling of steel) and for silica bricks (for lining steel or other furnaces).

The list of causative agents of dermatitis appears to be unlimited and new items have to be added each year. Two cases in 1938 were due to ultramarine. In each case the length of exposure was four years. A series of 25 cases of dermatitis on the hands and arms of girls employed in canning carrots was investigated. There is little doubt that the carrot juice was the primary causative factor. Experiments showed that a positive patch-test could be obtained with certain extracts of carrot. The spread of infection by roller towels is generally held to be a remote risk, but Dr. Bridge describes an outbreak in a factory of an infective skin condition which was thought to be spread by the use of communal towels. The firm was advised to suspend from work all persons suffering from the acute infection, to substitute individual paper towels for the roller towels, and to have the wash-basins regularly disinfected. These precautions were put into operation and no further case has occurred in the factory.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

BLOOD-TRANSFUSION SERVICE

THE appeal for 25,000 donors for this service is meeting with a slow but steady response. The service is open to all healthy men and women between the ages of 18 and 60 and people who are already engaged in other emergency services are permitted to enrol as donors. Early last week over 200 of the required 1500 had volunteered in Aberdeen, and in Edinburgh over 300 out of 5000. In Glasgow the figures were slightly better. Blood banks have been started in the main centres of population. The main organisation centres are: Edinburgh, J. R. Copland, 22 Gilmore Place; Glasgow, Town Clerk's Office, City Chambers; Dundee, Royal Infirmary; Aberdeen, Public Health Offices, 4 Albyn Place. In addition to these centres, prospective donors may apply to any local hospital, and the profession in Scotland is asked to encourage members of the public to volunteer.

NEW PROFESSOR IN ABERDEEN

His numerous friends in Edinburgh and elsewhere are delighted at the appointment of Mr. W. C. Wilson, F.R.C.S.E., to the regius chair of surgery in the University of Aberdeen. This appointment is, of course, consequent upon the resignation of Prof. J. R. Learmonth, who is succeeding Sir David Wilkie in Edinburgh. Mr. Wilson is well known for his work as a children's surgeon and for his research work on burns and on many physiological problems, notably in relation to the nervous system and the humoral transmission of nerve impulses. He is a prominent member of the group of surgeons who believe that research in pure and applied physiology constitutes the most useful field for the advancement of surgical and general medical knowledge. As a worker in, and lately as director of, the surgical research laboratory in Edinburgh University and as director of the surgical research unit in the Edinburgh Royal Infirmary, he has brought honour to the Edinburgh medical school. Edinburgh's loss will be Aberdeen's gain. This is the third exchange which has taken place between these two Scottish schools within a year.

PUBLIC HEALTH

EPIDEMICS IN RECEPTION AREAS

THERE are two distinct epidemiological dangers in reception areas. First, the evacuated children may introduce disease among the less immune natives : secondly, the rural conditions may expose the evacuated children themselves to infections from which they are not immune. The dangers to the native children are primarily diphtheria, scarlet fever and streptococcal throats, measles, whooping-cough and other fevers which may not have been prevalent in their area for some time. Further in rural districts there is the danger of water-borne infection by carriers among the evacuated children. The evacuated children themselves may be assumed to possess more immunity to the usual children's fevers than the natives. For them the main risks are water-borne and milk-borne diseases to which they are not immune.

The main water-borne risks are fevers of the enteric group and the bacillary dysenteries. Both these may also be spread by milk, as may be scarlet fever, diphtheria, undulant fever and tuberculosis. In urban areas much of the milk is pasteurised ; in rural areas very little. Therefore immunity from milk-borne diseases must be assumed to be rare among the evacuated children. Certain general precautions may be recommended. Where water is not piped, it should be boiled before being drunk. All unpasteurised milk should be boiled. Where sewage is not piped, it should be disposed of well away from, and if possible on a lower level than, wells. Children unused to the earth-closet should be warned to take simple precautions against contaminating the soil. Those in charge of evacuated children have their hands well filled and the imposition of these additional labours will not be welcomed. But should typhoid, dysentery or any other milk- or water-borne epidemic break out, the difficulties of treatment will be considerable. Isolation hospitals in rural areas are usually small and not easy to get at. Ambulances will be wanted for other purposes and home nursing will be more trying than in normal times.

In the past two years THE LANCET has published a series of articles on the control of the common fevers. It is felt worth while to summarise the main points made by this group of expert contributors.

ENTERIC FEVER

Season : September–November. *Incubation period :* 14 (7–21) days. *Second attacks* rare. Enteric is spread mainly by milk and water and occasionally by insect vectors. It is prevented by the proper disposal of sewage, the detection of carriers, the boiling of water and the pasteurising or boiling of milk.

Active immunisation.—T.A.B. vaccine given at intervals of 7–10 days (two to three doses) gives considerable protection, which is maximal soon after the last dose. Ideally it should be given in the absence of an epidemic. In the face of an epidemic inoculation does improve the chances if the subject is not already infected, but if infection is already present, the typhoid is likely to be worse—the so-called " provocative " typhoid. In a rural area vaccination of contacts will do more good than harm in spite of the risk of provocative typhoid. In an urban area with a temporary and remediable breakdown of water-supply, vaccination of the potentially infected is not advised, since the chances of provocative typhoid are considerable and the immunisation gained is not in time to help. Antityphoid serum may be given to contacts in two doses at 14-day intervals, thus ensuring some protection for six weeks or more. The practical value of this is, however, small (Topley 1938).

SCARLET FEVER AND STREPTOCOCCAL INFECTIONS

For scarlet fever, *season :* September–November. *Incubation period :* 3 (2–4) days. *Isolation period :* 6 weeks (4 weeks if mild). *Quarantine period* for contacts: 10 days. *Second attacks* rare. The chief methods of spread of scarlet fever and other streptococcal infections are by direct contact between individuals (including nurses and doctors) who are not necessarily ill. Occasionally milk is infected from a human carrier and streptococci have been found on toys and fomites. In institutions, contacts may be Dick-tested and temporary passive immunity established with 5–10 c.cm. of antitoxin. Outside institutions, the clinical and bacteriological detection of carriers is seldom practicable, unless they are prematurely discharged patients, with running ears or other foci of infection. Children sleeping in dormitories should have their beds placed alternately feet to head, so as to increase the distance between the sources of droplet spray. The liability of the streptococcus to produce either scarlet fever or sore-throat must be remembered (Allison 1938).

BACILLARY DYSENTERY

Season : Summer and autumn. *Incubation period :* 4 (1–7) days. As a mild gastro-enteritis, bacillary dysentery is much more common in England than is generally recognised. It can often be diagnosed only by very early bacteriological examination of the stools, and it has to be distinguished from food poisoning due to salmonella organisms and toxins. Large epidemics are rare. When they do occur they are usually due to massive infection of water or milk. Sporadic outbreaks in family groups are more usual. The condition is often endemic in children's wards and mental hospitals. Chronic carriers are probably only important in institutions. In the outside world spread is almost always from case to case, though often some of the cases may be so mild as to escape medical attention. The contamination of food, cooking utensils, milk and water may occur from the hands of sufferers.

The types commonly met with in England are those due to the Flexner organism (causing dysentery of moderate severity), and those due to the Sonne group (mostly mild cases). Shiga outbreaks are always imported from abroad and are therefore rare. They are the most severe, and serum is only worth using therapeutically in such outbreaks.

Apart from general measures of control for water and milk, the most important steps to check an epidemic are isolation of the patient whenever practicable and nursing under strict conditions, the stools being treated as are enteric stools. Such isolation may be stopped after one week of well-formed stools. In deciding when to stop isolation, it is useless to rely on bacteriological tests of stools, as negative tests are of no significance.

No standard method of vaccine prophylaxis has yet been worked out, though vaccines have been used with considerable success. A suitable vaccine contains 150 million each of the five common Shiga types of organism, and the same number of Sonne strains per ml. The Sonne strains must have been recently isolated and not subcultured too frequently. The dose for such a vaccine is 0·5–1 ml. according to age, and is best given subcutaneously. In institutions inoculation should be carried out once a year (W. M. Scott 1938).

DIPHTHERIA

Season : September–November (worse in dry years). *Incubation period :* 3 (1–4) days. *Isolation period :*

SEROLOGICAL CONTROL OF MEASLES

Nature of serum.	Dose in c.cm.	Dosage factor.	For prophylaxis.		For treatment.
			Protection.	Attenuation.	
Convalescent ..	5–20	Age × 2	1st–5th day after exposure	5th–9th day	Within 6 days of onset of disease
Normal adult ..	10–40	Age × 4	1st–3rd day	3rd–9th day	Dosage factor: age × 4
Whole blood ..	Double serum	Age × 4			Route: intravenous
Placental extract	7·5–30	Age × 3			

4 weeks. *Quarantine period:* 12 days. *Second attacks* may occur. Hospitalisation of most, if not all, cases of diphtheria has been the practice in this country for many years. This however does not diminish the incidence of the disease. Spread is from patients and carriers, who may be convalescent or healthy, and the organisms may pass by droplet spray or by milk to the patient. The most dangerous source of infection is not the occult carrier but the child with an overt blood-stained yellowish nasal discharge. It is possible and indeed probable that a number of such children are among those evacuated.

Immunisation has been going on slowly in many urban districts, but is rare in rural districts. In 1937 Chester headed the list with 45 per cent. of its child population immunised. Birmingham, Walsall, Worcester, Leeds, Manchester and Chatham were in the 35–40 per cent. group. The London boroughs vary greatly. Acton in 1937 led with 30 per cent., but the average was only 5·3 per cent.

The *prophylactic* method of choice is probably the alum-precipitated-toxoid (A.P.T.). One may give 0·2 c.cm. followed four weeks later by 0·4 c.cm. of A.P.T. The minimal interval between the two doses is two weeks. One injection alone is of little value. The results should always be checked if possible by the Schick test. Passive immunisation by the injection of 1000–2000 units of antitoxin will protect exposed children for three weeks. It is best to precede this by a Schick test. It may be followed immediately by active immunisation, but A.P.T. or formol-toxoid (F.T.) should be used, as these contain no horse serum. Diagnosis must not wait upon a bacteriological report. The tellurite test has a high percentage of error and should therefore not be used. Treatment should begin the moment a clinical diagnosis is made. Active immunisation has been said to increase the number of carriers (by preventing some of these from developing the disease) and thus to increase the risk of infection in the unprotected. The evidence on which this statement is based is doubtful and the immunisation of nurses in fever hospitals has not increased their carrier-rate (E. H. R. Harries 1939).

WHOOPING-COUGH

Season: Spring and autumn. *Incubation period:* 14 (7–21) days. *Isolation period:* 4 weeks, if quite fit at the end of that time—even if still whooping (some authorities still recommend 6 weeks). *Quarantine period:* 3 weeks. *Second attacks* never occur. Whooping-cough shows a biennial periodicity alternating with measles. This year in England whooping-cough is likely to be severe. In its treatment vaccines are useless and convalescent serum of little value. It is most dangerous in children under two years of age, and in a family where one case occurs it is worth while to give any other children under two years 10–20 c.cm. of parental blood intramuscularly thus producing a temporary immunity. Prophylactic immunisation with a vaccine is not yet really in the sphere of practical politics. It will definitely attenuate attacks (a valuable hygienic measure in as much as permanent immunity is then ensured), but it will not prevent attacks (Cruickshank 1938).

CEREBROSPINAL FEVER

Season: Winter and spring. *Incubation period:* 4 days. In this condition carriers are probably extremely common but susceptibles rare. Epidemics are only likely to occur in crowded quarters such as barracks. The best prophylactic measure so far known, apart from the proper ventilation of sleeping quarters, is for all in contact with a case to gargle with 1: 1000 potassium permanganate. Treatment is now a question of chemotherapy.

POLIOMYELITIS

Season: August–September. *Isolation period:* 6 weeks. *Quarantine period:* 3 weeks. Epidemiologically poliomyelitis is somewhat similar to cerebrospinal fever; that is to say, carriers are common but susceptibles are rare. Child contacts are more dangerous than adult carriers. Isolation of patients and contacts is the only effective control measure. Where the school is the only meeting place for children, as in very scattered rural areas, closing the school is said to be of value. The case for closing residential schools is still debated. If the children are dispersed, they must go into quarantine. Treatment with convalescent serum is of small value only, and vaccines for active immunisation are useless (MacNalty 1938).

MEASLES

Season: December–January, and May–June. *Incubation period:* 14 days. *Isolation period:* 10 (9–14) days. *Quarantine period:* 16 days. Measles in England shows a biennial periodicity and 1939 is not a measles year. Treatment with immune convalescent serum in doses of 10–50 c.cm. has been used, but its value is not proved. In prophylaxis, isolation alone is useless. Immune serum will give complete protection for 14–21 days. It is specially indicated for children under three years of age and in patients exposed to infection and already suffering from some other disease in whom measles might prove very dangerous. In general attenuation with normal adult serum is the ideal to be aimed at. The intramuscular dosage with the different varieties of serum and blood, and the results, are shown in the table above (Gunn 1938).

UNDULANT FEVER

Incubation period: 14 days. Not less than half the herds in this country are infected with the *Brucella abortus*. The condition is twice as common in males as in females and is uncommon in children. Infection is always from cattle either by direct handling or via milk or milk products. Pasteurisation or boiling definitely makes milk safe; tuberculin-tested milk is not safe (Dalrymple-Champneys 1938).

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GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM D.P.M.

II

AMONG the compensations of middle age is the fun of watching one's contemporaries turn into their parents. I can remember thinking, when I was a child, that my friend's parents were acts of God. I could not imagine them younger or older; they were portents as ageless as the pyramids and rather less explicable. That they had begun differently and grown to that pattern never once occurred to me; I must have been a dumb child. Nowadays I can watch them being created before my eyes; and though I find it pleasant, it alarms me because I know I am undergoing the same process. To be so constantly aware of the change is disconcerting: it makes one feel unreal and ephemeral on the one hand, and permanent and indestructible on the other. It lends point to the remark of the geneticist that a hen is simply the device of an egg for producing another egg, but robs it of any sting; for obviously the device has a more amusing time than the egg.

One sign of maturity which I detect in my friends and myself is a taste for gardening. As far as my experience goes, gardening is not particularly popular with the young—possibly because the gardens in which they are invited to spend their energy are seldom their own. Anyhow, I can recall being irritated by the sight of my parents pottering round the garden, and I remember turning sulky when I was asked to help; and now I am among the potterers and getting grimier in the nail-beds as the years go by. The other day a young man told me in an angry voice that his parents thought of nothing but their garden, and I looked at him commiseratingly. The mark of the potterer is on his brow; in another fifteen years, Hitler permitting, he will be out among the bean-rows, I expect.

* * *

How is it that experts in occupation therapy have made no particular use of dramatic performances as treatment? To prepare and perform a play is a highly social activity; everyone is involved on more or less equal terms, and with a little organisation everyone can be given as much to do as he will stomach. Scenery, lighting, costumes and stage-management can be trusted to keep any number busy; the musical programme will usually provide a full-time job for anyone with a trace of talent; and the acting itself is a gift to the psychotherapist. Young things who fancy the world against them can release much of their self-pity in a sympathetic part; those who never attract notice can be sure of the attention and applause of a roomful of people; and the unattractive clumsy one, guided by a skilful producer, can win the affection of the whole house as a comedian. Add to this the pleasant touch of excitement which clings about the theatre and you have the perfect atmosphere for restoring and maintaining mental health. In fact after one or two productions probably the only person in need of psychotherapy will be the producer; but in the combined cause of art and science who would not sacrifice a producer or two?

Gas masks for children between the ages of two and five, I am told, are decorated with pictures of Mickey Mouse. What a civilisation! German infants, presumably, would see through such hollow entertainment; judging by Clare Leiser's "Nazi Nuggets," quoted in last week's *New Statesman*, Mickey has lost his public in Germany: "Mickey Mouse is the most miserable ideal ever revealed. . . . Healthy emotions tell every independent young man and every honourable youth that the dirty and filth-covered vermin, the greatest bacteria carrier in the animal kingdom, cannot be the ideal type of animal." However, I can't help feeling that there are German babies who disappoint their preceptors in this, and continue to find the gallant and resourceful Mickey as attractive as the brave little tailor of their own fairy tales.

Until recently I had the impression that most people in this country were kindly disposed towards the German people, as distinct from their leaders and political system; but a night or two ago, happening to remark that it was agreeable not to have to feel rancour towards the Germans themselves this time, I was depressed to find that hardly anyone agreed with me. The room was full of young people who no doubt were justified in resenting bitterly the overthrow of their future; but it was saddening all the same to hear the ghostly phrases of 1914 echoing through their conversation—"no peace until they are stamped out"—"break Germany up"—"all the young people in Germany are longing for war"—"root and branch." The Prime Minister has told us, with splendid discrimination, the evils we are fighting: brute force, bad faith, injustice, oppression and persecution. He is right; those are the things we want to destroy—if we can find a way to hit the target. Unfortunately, as in all wars, we shall be fighting many who hate these things as much as we do; the few who uphold them will be shielded by armies of just and honest men. If we can keep this in mind we shall do a little better than we did last time. Once or twice in the last few days I have found myself thinking of a remark which Sir James Barrie once made to the students of Edinburgh University, a great remark in my opinion. I quote it from memory, and probably inaccurately: "Do not attribute to your enemy motives meaner than your own. Nothing so debases the moral currency. Give it up and be great."

* * *

The trouble about this war, or so I think after five hours of it, is that it is too well organised. There is none of the haphazard, go-as-you-please atmosphere which I seem to recall in 1914, with the theatres playing to crowded houses and everyone feeling brisk and disorderly. Perhaps this, being a Sunday war, is bound to have some of the atmosphere of the traditional English Sunday; or perhaps I see the last war—"The War," as we used to call it in our innocent way—through a golden haze. However, I am not really qualified to give an opinion because I find on thinking it over that nearly all my memories of the last war are gastronomic. True, I was a growing child at the time, if that can be regarded as an excuse, but it had not occurred to me before what

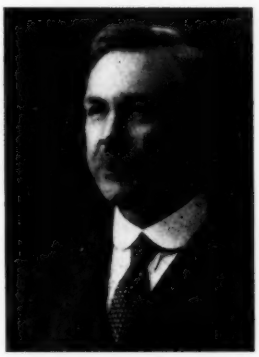
a greedy one I must have been. The thought of returning to the diet of those days hardly troubles me now; perhaps my soul no longer resides in my pylorus, though I have no evidence of its taking up any other situation. It will even be amusing in a way to see the old menu cropping up again. That indefatigable codfish, for example, is he still waiting to lay down his life for us, pale, flaccid, slippery, and tasting of wet cotton-wool? Shall we see that queer substance honey-butter replace jam? Will sugar mysteriously convert itself to saccharine, and the hens give up laying as a protest against the European situation? Will potatoes turn hard, blackish and semi-translucent, like rather grubby candle-grease? Worst of all, must we again face rice-pudding made with dried milk? That pudding really excites my indignation, even in retrospect. I can remember air-raids too, but without acrimony. For some reason that rice-pudding will stick in my gizzard till I die.

OBITUARY

ARTHUR LAUNCELOT FLEMMING

M.B. BRIST., M.R.C.S., D.A.

Dr. Flemming's death last week at his home at Clifton will be keenly felt in Bristol, where he did so much for the teaching and proper establishment of anæsthetics at the Royal Infirmary. The son of a Freshford practitioner, he went to school at Somerset College and Hermitage House, Bath, going on to Bristol University and medical school. After taking his M.R.C.S. in 1894 he held resident appointments until he was attracted to the war in South Africa, where he became surgeon to the Princess Christian Hospital. Returning to Bristol for his degree in 1910 he began to specialise in anæsthetics and was registrar and anæsthetist first at the women's and homœopathic hospitals, later at the orthopædic hospital, and finally at the infirmary. He was also well known to London anæsthetists as an assiduous attender of the sectional meetings of the Royal Society of Medicine; he was president of the section of anæsthetics 1922–24. He also played a part in the formation of the Association of Anæsthetists, serving on its first elected council. He was a sound rather than a profuse writer on professional topics, and had a literary sense which served him well as editorial secretary for many years to the *Bristol Medico-Chirurgical Journal*. He was president of the Bristol Medico-Chirurgical Society 1926–27. All who knew him were impressed with his directness and sincerity.



JOHN GRAY

M.D. EDIN.

Dr. John Gray, reader in pathology at the British Postgraduate Medical School at Hammersmith, died last week in his fortieth year. He had been in failing health for two years and the end was not unexpected. None the less, his death comes as a loss not alone to pathological teaching and research but to a wide circle of friends. Gray came from Edinburgh, where he attended George Heriot's school, serving as a private in the Highland Light Infantry in 1918. He then had a brilliant career in Edinburgh University, taking first place in almost every subject and the Cunningham, Vans Dunlop, Murchison and Stark scholarships. After graduating in 1923 he held the Allan fellowship in clinical medicine and surgery, assisted in the anatomy department, and did some research on the embryology of the pituitary gland. He was then house physician to the Royal Infirmary and in 1925 passed from there to Aberdeen as senior assistant in pathology and later lecturer, holding concurrently the Leckie-Mactier fellowship awarded him by Edinburgh. In 1927 he took his Edinburgh M.D. with gold medal for a thesis on nephritis and six years later, at the request of the Medical Research Council, he expanded this thesis into a monograph which was published as Special Report (1933) No. 178. The establishment of the radium centre enabled him to study the histological effects of irradiation on malignant growths and diseased tissues; his studies included hypernephroma, endothelioma, rhabdomyoma and peri-arteritis nodosa. In Aberdeen it was his duty to report to the hospitals on all autopsies; these numbered well over a thousand during his period of office, and he had a good deal of medico-legal work to do on behalf of the procurator fiscal. It was in 1934 that he left Aberdeen for Hammersmith with the reputation of a lucid and informed lecturer; there he helped to create the liaison between clinician and laboratory staff by organised discussions which were something new and highly satisfying in medical teaching. The regard in which he was held was heightened by his modest bearing and the easy way in which he carried his learning.

CHARLES HEWITT MILLER

C.B.E., M.D. CAMB., F.R.C.P.

THOUGH he left the London Hospital in 1925, Dr. Miller was very much a London Hospital man. Educated first at Rugby and Trinity College, Cambridge, he qualified in 1901, and after holding many house appointments at the London acted as director of the pathological institute there from 1905 to 1907. He did not want to become a pathologist and he joined the staff of the Victoria Hospital for Children in 1906, the Metropolitan Hospital in 1909 and the Brompton Hospital in 1912. But his clinical medicine was founded, more than most men's, on observation in the post-mortem room, and he carried into practice the painstaking method of the morbid anatomist. Since failure to observe is the usual cause of failure in diagnosis, he was a good diagnostician, and his habit of carefulness was transmitted to his students. It seemed to them—as indeed it was—part of the hospital tradition.

In 1913 Miller was appointed assistant physician to the London, and when the late war came he saw distinguished service; he ended the war as a full colonel, having been consulting physician to the British Expeditionary Force and twice mentioned in despatches. After demobilisation he was created C.B.E. Meanwhile he had been elected F.R.C.P. in 1916 and in the following year had delivered Goulstonian lectures on the paratyphoid infections, which may be read in our columns. On Jan. 19, 1920, he took charge of the

newly established medical unit at the London Hospital, and as first director served nearly five years. He was an exacting teacher, a stickler for thoroughness in clinical examination, never hurried and intolerant of slackness. But if he was sometimes impatient with his clerks he was never impatient with the sick. A big heavily built man, with a somewhat heavy clean-shaven face and a slow manner, he was gentle in his approach and sensitive in mind.

His writings were not many. He was especially interested in peptic ulcer and its consequences, and in the relationship between the gall-bladder and cardiac pain. In this last indeed he took a very personal interest, for it was an attack of coronary thrombosis, and the ill health that followed, that made him give up his busy consulting practice. In a letter to THE LANCET in August, 1934, signed "Live and Learn," he gave an account of this attack, of how eighteen months later he decided to start practice somewhere else on a more leisurely plan, and of how he gradually regained power to do almost anything he liked, from ski-running to salmon-fishing. This letter, like one or two others it inspired, is full of useful information for anyone with cardiac pain, and it has the charm of sincerity and self-revelation.

The place Dr. Miller chose for his new practice "on a lower level of action" was Exeter, where he was appointed to the staff of the Royal Devon and Exeter Hospital. "It was not long," writes a Devon practitioner, "before he was in great demand as a second opinion. His wide knowledge of medicine, his simplicity and his great good sense came as a breath of fresh air to those of us who called him in to help with our problems. It was felt that, if anybody could clarify a situation, he could; and his therapeutic suggestions were always practicable and never complicated. His lectures to the Devon and Exeter Medico-Chirurgical Society and his remarks during discussions on cases were conspicuous for sanity and he never used a long word where a short one would serve the purpose."

The last phase of Miller's career began with his appointment in 1937 to the staff of University College Hospital, where approaching retirements were likely to leave the physicians a group of unusually young men. Here it was his primary task to fill a gap, but he did much more.

Dr. Miller died on Aug. 29 at his country home, Littlewick Place, near Maidenhead. He was the son of Charles James Miller of Manchester and was born at Eccles, Lancashire, in 1875. He married in 1908 Phyllis Tarbutt, and she survives him with two daughters.

R. H. writes: "In Charles Miller we have lost a physician of the characteristically British type, for he was an excellent clinical observer, guided always by sound practical common sense, rather distrustful of the newer 'scientific' medicine and an admirable bedside teacher. His complete sincerity was apparent to all who came in contact with him, for he had a hatred of all that was false or pretentious and his bluff hearty manner endeared him to his friends, whilst the outspokenness with which he expressed his opinion made him respected by his opponents. He was, indeed, a 'white' man through and through. His later years were clouded by ill health which he bore with stoicism, but the high compliment which was paid to him by his election as senior physician to University College Hospital was a source of great pleasure and encouragement. He died very suddenly, fortunate in that he did not live to see the actual outbreak of the present war to which, from his experience in the last, he had looked forward with horror. His home life was singularly happy, and deep sympathy will be felt for his widow and his two daughters."

LETTERS TO THE EDITOR

NEUROSIS OR PSYCHOSIS?

SIR,—Dr. Gillespie's comment on your leading article of Aug. 19 is perhaps based upon misunderstanding of the view taken by at least some who hold that the difference between neurosis and psychosis is quantitative rather than qualitative. He supposes that this view implies that "since the neuroses are but mild psychoses, and since psychotherapy is of little use in the latter, so it is of minor importance in the former." These assumptions require scrutiny. It is true that certain aspects of the mental disorder encountered in the psychotic—such as relative inaccessibility and lack of insight—obstruct or prevent the use of psychotherapy. Nevertheless there are psychotic patients who undoubtedly do benefit from this form of treatment. Apart from the question of scientific accuracy therefore, I believe one of the disadvantages of a qualitative distinction between neuroses and psychoses to be this, that it may encourage the physician, having labelled a patient psychotic, to assume that psychotherapy cannot help him.

Dr. Gillespie's second assumption, that if the quantitative distinction be accepted and it be admitted that psychotherapy is of little value for the psychoses, therefore it is of minor importance for the neuroses, is surely unfounded. Because operation is of little use in certain advanced cases of malignant disease it does not follow that it is of minor importance in the treatment of more circumscribed growths of the same histological type.

I am entirely in agreement with Dr. Gillespie in his objection to the recognition of lay psychotherapists. In fact I believe that if a man is to become a good psychotherapist he must needs first be a good doctor.

Finally, Dr. Gillespie quotes from my lecture words which, when detached from their context, appear to contain an overstatement. I accept of course Dr. Gillespie's view that there is room, and more room, for specialist psychotherapy, and that the man who has had a long training and devotes himself entirely to this work, can achieve results—especially in the more difficult cases—which are beyond the reach of the ordinary practitioner. But it is the ordinary practitioner who has to, or ought to, treat the great majority of neurotic patients, and for him some simpler and shorter training must suffice. Moreover, I believe that the simpler forms of psychotherapy, as opposed to the more recondite, are very often successful.

So much has now been written about the different methods of psychological treatment, especially the analytic kind, that the general practitioner is apt to be frightened of the subject altogether, apt to feel that, unless he has had a prolonged course of training, he cannot tackle his neurotic patients with any hope of success. This view I believe to be wrong. I

maintain that a good doctor, with the right personal qualities and with a few fundamental principles to guide him, can learn from his own experience to be a good "general" psychotherapist. That is to say, he will be able to treat most of his neurotic patients successfully. The exceptional cases he will refer to the specialist.

If, then, adequate provision is to be made for the treatment of the neuroses, those who are responsible for medical education should have two objects in mind. One is the training of specialists in the more recondite methods of psychotherapy; the other is the training of the medical student and general practitioner in the shorter and simpler methods.

It was to an audience of medical students that my lecture was addressed.

I am, Sir, yours faithfully,

Henley-on-Thames, Sept. 3. C. P. SYMONDS.

PULMONARY TUBERCULOSIS AND ANTUITRIN S

SIR,—From the response of one case of pulmonary tuberculosis to treatment, it is useless to attempt to prove anything. But for the war, I should have tried out what I now describe on a series of patients. As it is, I leave the proof or disproof of my inferences to others. I feel I must, however, record my findings, firstly because they were so dramatic, and secondly because they were, for theoretical reasons, expected. Further, the antithesis of the treatment nearly killed a control patient.

The theoretical observations which led me to try out my new line of treatment were as follows. Pulmonary tuberculosis is a common disease in young women. It is especially common in the flat-breasted, thin, under-developed, sexless type with scanty periods; this type does not do well. Although amenorrhœa is produced by any disease which causes cachexia, anæmia and ill-health in pulmonary tuberculosis, it is often present before these have appeared. After sexual activity or child-bearing, the type of female I mentioned often becomes more physically fit and sexually developed (assuming she has not yet had tuberculosis). I therefore suggest that, in as much as immunity depends upon physical fitness, it depends also upon a sound set of endocrines. With these thoughts in mind I tried out a pituitary preparation as a therapeutic measure to increase the resistance of one of these poorly developed tuberculous women.

A female, 34 years of age, had been suffering from schizophrenia for 13 years. She made no mental improvement during this time, but till two years ago her physical health remained satisfactory. She then started to lose weight gradually but not consistently, gaining in some months and losing in others. Three months ago the fall in weight became continuous at the rate of 1 to 3 lb. per month. I first saw her on July 9 this year. She had abnormal physical signs at her right apex, her sputum contained tubercle bacilli, and the X-ray showed advanced right-sided unilateral pulmonary tuberculosis. She had had amenorrhœa for some years, but this was probably secondary to her mental disorder. She had only a slight cough and had never had a hæmoptysis. She was seen by a consulting physician who suggested that the disease had been present for two years in as much as her weight had fluctuated for that time.

She was treated symptomatically, and from July 9 till August 12 she ran an intermittent temperature rising every night to about 100° F. The pulse varied between 110 and 120. On August 14 she was given 2 c.cm. of Antuitrin S, and the dose was repeated every other day for four doses in all. It was then raised to 5 c.cm. still on alternate days for another four doses. On the day after starting this treatment her pulse dropped to 90 and has never since risen above 110. On the eighth day her temperature was normal and has since never risen above normal.

During July she lost 8 lb. in weight. In the last three weeks she has regained this to within 2 lb.

The antithesis was when I tried giving Antuitrin G to a similar patient; there was a considerable rise of temperature and pulse.

I know only too well that tuberculosis shows remissions and exacerbations, but in the case I have described I ventured to expect this remission, and it followed immediately upon starting treatment.

I am, Sir, yours faithfully,

Orpington, Kent, Sept. 3. D. G. PRICE.

A PEACE OF UNDERSTANDING

SIR,—Your leading article under this heading must have been to many like a bright and helpful light, giving a lead for constructive effort when the need for it is great. During the twenty-five years since 1914 medical psychologists and psychiatrists have fully confirmed in clinical practice the superiority of sympathetic understanding over coercion as a basis for the control of anti-social violence in individuals whose mentality is unbalanced. This knowledge is surely the best available basis for an effective long-term policy aiming at the elimination of similar destructive urges in the international field.

But, as you pointed out last week, to deal with the disruptive force of this kind of aggression we need a moral courage to face the evils in our own human nature. If we are to make of this war—or rather of the peace, which we and our allies hope to be able to shape when it is over—something better than a repetition of the mistakes made from 1914 onwards, it is essential that enough of our people, and especially those in authority, should find this moral courage.

The lead might well come from those of our profession whose experience enables them to agree at once with the views which you have expressed, since they at least can recognise the harm done by their own mistakes. The difficulty is to put forward these views in such a way as to enable others to accept them. It would be a fatal error to embark on propaganda which might appear to those to whom it is addressed as an accusation of moral turpitude, conscious or unconscious. We all know that the inevitable result of such an approach is to strengthen the defences against conviction. My hope is that the lead which you have given may bring together a few hundred medical men and women who will first discipline themselves so that they may eliminate all appearance of self-righteousness and superiority from their relationship with the public. They might even set themselves the task of achieving unanimity in their pronouncements, and publish an account of their difficulties in this achievement, in sufficient detail to show that they have had to overcome the same weaknesses in themselves which they invite others to tackle.

I venture to suggest that you should make available for distribution to the public copies of your leading article of last week, or an adaptation of it addressed especially to them; and, so that no individual need assert himself as the prime mover, you should take the initial steps in bringing together those who wish to act vigorously in the direction you have indicated.

I am, Sir, yours faithfully,

Devonshire Place, W.1. Sept. 5. J. NORMAN GLAISTER.

LANDING AT DOVER

SIR,—In Grains and Scruples of your issue for Christmas week, 1937, I made an appeal for funds to allow some care to be taken at Dover marine station of the Austrian and German domestics then entering the country in large numbers and often in a state of collapse after their journey. The sum of £45 15*s.* was collected and, as this fund is now to be wound up, those readers who generously subscribed to it may like to know how the money was spent and what it is proposed to do with the balance remaining. It may be mentioned that the two largest donations came from the German embassy and an anonymous donor.

The London branch of the Travellers Aid Society, who administered the fund, found a German-speaking resident of Dover who proved to be the ideal person for the task. For a small weekly sum, she met every day during the twelve months from January, 1938, the two boats on which most of the foreign domestics arrived. The nature of the work done can best be shown by some extracts from this lady's reports:—

February.—During this week I met approximately 250 foreign maids who passed through the port of Dover. These consisted of Austrians, Hungarians, Swiss and Germans. All could speak German but not one had a working knowledge of English. I met them before they passed through the passport office and explained what they would have to do in regard to passport, medical and customs examinations and from which platform their train would go. I helped as much as I could with the translation at the medical office and customs.

. . . I have also been able to help with outgoing maids, as yesterday when an official asked for my help with an Austrian maid who had lost the only boat for Ostend. She was very frightened and had very little money but I was able to find her a cheap lodging in the youth hostel here and then see her off by the boat next day.

March.—All of these girls are in real need of help . . . they are almost overcome with fatigue and seasickness. They are in most cases of a simple nature, coming as they do from little villages and farms, and they are quite at a loss to know what to do on arrival: I often am asked to fill in their landing cards.

Many of them have but the vaguest of ideas where their destinations are. . . . Girls weeping bitterly who have lost or mislaid their suitcases, others who are desperately anxious because they have missed their train and a regrettable few who are not allowed to land and stand bewildered and downcast wondering how they will return to their own country. . . . it is touching to see their gratitude after some soothing explanations in their own language.

It is pleasant to record the helpfulness of the officials; the recognition of the work by the Southern Railway, shown by their reservation of two compartments for the girls; the kindness of the station caterers, Messrs. Frederick Hotels Ltd., in allowing tea to be obtained at half-price; and the generosity of the large majority of porters who forwent their usual tips in needy cases. Finally, a generous tribute has been paid in the annual report of the medical inspector of aliens at Dover—who first pointed out the need for the work—that it had "earned the gratitude of some 9000 weary, homesick, hungry servant girls who arrived at Dover during the year."

At the end of January, 1938, the Travellers Aid Society (London branch) became amalgamated with the National Vigilance Association and about the same time the society's worker found herself obliged to give up the work. Fortunately by this time a radical change had occurred, chiefly as a result of the discouragement by the German authorities of their nationals from taking up domestic service abroad. Some Germans and Austrians continue to enter with permits for domestic service but they are nearly all refugees of a somewhat different social class. Swiss, Hungarians and other nationalities still enter but they seem to be better organised and cared for. It is the general opinion that the work may now be given up without much hardship and it is proposed to hand over the balance of the money subscribed, £17 3*s.*, to another fund with similar objects: the Germany emergency committee of the Society of Friends would seem to be an appropriate recipient.

I am, Sir, yours faithfully,

Aug. 10. CIVIL SERVANT.

*** It may still be of interest to put on record a piece of beneficent work now so completely closed.—ED. L.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED AUG. 26, 1939

Notifications.—The following cases of infectious disease were notified during the week: Smallpox, 0; scarlet fever, 1170; diphtheria, 745; enteric fever, 62 (57 "expected"); pneumonia (primary or influenzal), 328; puerperal pyrexia, 183; cerebrospinal fever, 19; poliomyelitis, 34; polio-encephalitis, 2; encephalitis lethargica, 2; dysentery, 32; ophthalmia neonatorum, 85. No case of cholera, plague, or typhus fever was notified during the week.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 1 (0) from enteric fever, 2 (0) from measles, 1 (0) from scarlet fever, 14 (5) from whooping-cough, 16 (2) from diphtheria, 32 (5) from diarrhœa and enteritis under two years, and 15 (2) from influenza. The figures in parentheses are those for London itself.

Chesterfield reported the only death from typhoid. Fatal cases of diphtheria were scattered over 12 great towns, Sunderland and Birmingham each reporting 2. Sunderland had 5 deaths from diphtheria, Birmingham 3.

The number of stillbirths notified during the week was 240 (corresponding to a rate of 36 per 1000 total births), including 35 in London.

The Lancet 100 Years Ago

September 7, 1839, *p.* 867.

From a report of the proceedings of the British Association.

We must notice an important practical suggestion of Professor GRAHAM at greater length, as it may be the means of saving many lives. He observed that the *afterdamp*, or carbonic acid, left in the atmosphere of a mine, after explosion, is supposed to occasion in many instances a greater loss of life than the explosion; at the same time it renders assistance impracticable. In many cases the oxygen of the air is not exhausted by the explosion, although, from the presence of five or ten per cent. of carbonic acid, it is rendered irrespirable. The atmosphere will be rendered respirable by withdrawing carbonic acid, and he suggested a method by which this might be effected. He found that a *mixture of slaked lime and pounded Glauber's salts, in equal proportions*, has a singular avidity for carbonic acid, and that air might be purified completely from that deleterious gas, *by inhaling it through a cushion of not more than an inch in thickness, filled with that mixture*, which could be done without difficulty.

". . . Alfred Marshall avoids the term 'standard of living' and distinguishes between the *standard of life*, meaning 'the standard of activities adjusted to wants,' and the *standard of comfort*, 'a term that may suggest a mere increase of artificial wants, among which perhaps the grosser wants may predominate.' 'A rise in the standard of life implies an increase in intelligence and energy and self-respect; leading to more care and judgment in expenditure, and to an avoidance of food and drink that gratify the appetite but afford no strength, and of ways of living that are unwholesome physically and morally.'"—STUART A. RICE, *Science*, Aug. 25, 1939, p. 167.

PARLIAMENTARY INTELLIGENCE

FROM THE PRESS GALLERY

Military Service from 18 to 40.

IN the House of Commons on Sept. 2, Mr. ERNEST BROWN, Minister of Labour, asked leave to introduce a bill to render all fit male British subjects of the ages of 18 to 40 inclusive liable to be called up for service in the armed forces of the Crown during the war emergency. He said the bill itself did not in general directly place a liability on these citizens to be called up for service, but it provided for a proclamation to be issued from time to time. Men liable to be called up for service would be required to register, they would be medically examined and they would receive their enlistment notice. The procedure for these purposes would be similar to that which had been applied in respect of militiamen under the Military Training Act.

Sir DERRICK GUNSTON said that undergraduates at the universities under the Military Training Act were allowed, and indeed compelled, to postpone their service. He wished to know whether this new measure would abolish such postponement of service.

Mr. HORE BELISHA, Secretary of State for War, said for all intents and purposes the Military Training Act fell to the ground, and was replaced by this bill. The young men who had obtained postponement under the Military Training Act would fall within their age groups, and would be entitled to seek postponement in the way provided in the present bill.

Leave was granted, and the bill was read a second time. On Sept. 3 the bill passed through all its remaining stages in both houses and was given the royal assent.

Compensation for War Injuries

On Sept. 2 in the House of Commons Sir WALTER WOMERSLEY, Minister of Pensions, asked leave to introduce a bill to make provision as respects certain personal injuries sustained during the period of the present emergency. He explained that the object of the measure was to provide for grants in respect of personal injuries or death caused by air raids, or other operations of war, to the civil population. The injury allowances were designed to be immediate emergency payments to tide a man over the first results of an injury. Treatment would also be given immediately under Ministry of Health arrangements at local hospitals, or by private practitioners, if the case was not sufficiently serious to go to hospital. After sufficient time had elapsed to judge the conditions, if it was found that the case involved serious and prolonged disablement, then the bill provided that a pension might be granted for a period or permanently, as might be required by the circumstances. Pensions would be awarded on service lines, that was to say, in accordance with the medically certified degree of physical disablement. The bill suspended the exercise of rights under the Workmen's Compensation Acts, or rights at Common Law, or under contract, in the case of incapacity for work caused by war injuries, or war service injuries. The grant of injury allowances and pensions would take the place of any compensation which a man might otherwise be able to obtain by an action at law.

Dr. HADEN GUEST asked whether the class of case in which primary injury might be trivial, but the final injury might be very serious, would be adequately looked after. There were many cases, he said, where an injury to the head appeared at first to be nothing much more serious than a scalp wound, followed in a little time by a headache, but finally there might be found an actual effusion of blood below the skull, causing pressure on the brain and giving rise to very serious nervous conditions, or even sudden death. Unless a preliminary injury was very carefully diagnosed and recorded, those cases might be very difficult to deal with, because there would not be adequate evidence of how the injury occurred. Another class of injuries which was likely to occur under war conditions were psychic injuries, apart from the purely physical nervous apparatus, as a result of which, after a considerable period, a person might suffer from a nervous condition directly attributable to the injury, although the injury might have been at the beginning a very small thing. Omission to pay adequate compensation to an individual injured might be safeguarded against if provision was made that all war injuries, especially those likely to lead to nervous or psychic disturbances, were very carefully recorded at the time they took place.

Sir WALTER WOMERSLEY said he had secured a committee of eminent medical specialists on nervous diseases, who would make to him a full report. He would then be able to act on their report, as upon other matters that might be brought forward from time to time by expert medical advisers.

Leave was granted, and the bill was read a second time. On Sept. 3 the bill passed through all its remaining stages in both houses, and was given the royal assent.

War Service and Health Insurance

On Sept. 2 in the House of Commons Mr. ELLIOT, Minister of Health, asked leave to introduce a bill the main object of which, he said, was to secure that persons insured under the scheme of National Health Insurance contributory pensions did not suffer any loss of rights under those schemes by reason of joining the armed forces of the Crown, or entering upon war occupations. The bill provided, in effect, that on return to civil life all such persons would find themselves in the same position as if they had been continuously in insurable employment throughout their period of service or war occupation. There was a further provision in the bill dealing with the adjustment of health insurance benefits and contributory pensions to payments which were made in respect of war injuries or pensions paid in respect of death due to war. In effect the bill merely secured that double payments from public funds were not made in respect of the same event; the approved societies, that was to say, were safeguarded against having to make payments for which no financial provision was made in the scheme of national health insurance. There were further provisions to the effect that insured persons would be able to secure payment of benefits or pension although the records affecting their title might not be available when the claim arose, due to the possible destruction of records as a result of the war.

Leave was granted, and the bill was read a second time. On Sept. 3 the bill passed through all its remaining stages in both houses and received the royal assent.

Surgeon Commander J. F. M. CAMPBELL, M.B., has been appointed to the Admiralty, and will serve as assistant to the Medical Director-General in succession to Surgeon Commander A. W. North, L.M.S.S.A., who, after four years there, has received another appointment.

Dr. W. HARVEY SMITH died on Sept. 1 at Merriden, Warwickshire, where he was equally well known as family doctor, county magistrate, sportsman and raconteur. For 35 years he was medical officer to the local poor-law institution. Always a lover of animals, he was as much at home with their injuries and diseases as with those of his human patients. When he reluctantly gave up his dogcart it was for an open car in which he always drove in one gear. He was in his 84th year.

Dr. P. W. MACVEAN, who died on Aug. 30 at the age of 68, had practised in Bradford since 1912 when he retired from the Navy as staff surgeon. His wife is Miss Phyllis Hambledon, the novelist.

MEDICAL NEWS

Society of Apothecaries of London

At recent examinations the following were successful:

Surgery.—J. V. Braithwaite, W. D. Jenkins, E. A. Milner, T. Owen, D. B. Roberts, E. Smith, H. F. Sparling, E. Wolfendale and H. Woolwich.

Medicine.—E. J. S. Barthorpe, A. N. Boyle, R. M. Coplans, M. E. Davies, D. H. Dracup, R. H. Gaman, T. L. B. Iredale, J. Lieber, M. C. Mair, E. C. G. Miller, E. A. Milner, D. Prysor-Jones and G. L. L. Reynolds.

Forensic Medicine.—E. J. S. Barthorpe, A. N. Boyle, R. M. Coplans, M. E. Davies, D. H. Dracup, R. H. Gaman, T. L. B. Iredale, J. Lieber, M. C. Mair, E. C. G. Miller, E. A. Milner, D. Prysor-Jones and G. L. L. Reynolds.

Midwifery.—C. Bucknall, D. W. Burnford, P. S. Clarke, G. O. C. Davies-Webb, W. Gordon, K. P. D. Griffiths, S. T. Nakib, K. W. N. Palmer, V. N. Stevenage and M. Venugopalacharii.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery and midwifery:

A. N. Boyle, Manc.; R. M. Coplans, Middlesex; D. H. Dracup, Lond. Hosp.; K. P. D. Griffiths, Charing Cross; T. L. B. Iredale, Leeds and West Lond.; J. Lieber, St. George's; E. C. G. Miller, Melb.; D. Prysor-Jones, L'pool; E. Smith, Oxfd. and Guy's; V. N. Stevenage, Madras and West Lond.; and H. Woolwich, L'pool.

University of Aberdeen

As reported by our Scottish correspondent on p. 617, Mr. W. C. Wilson, director of the unit for clinical research in surgery at the Edinburgh Royal Infirmary, has been appointed regius professor of surgery in the University.

Joint Tuberculosis Council

This council has arranged to hold a course in radiology at the clinic, Shire Hall, Castle Hill, Cambridge, from Sept. 20 to 22. A course in the diagnosis and treatment of pulmonary tuberculosis in Lancashire will be held at the Tuberculosis Offices, 352 Oxford Road, Manchester, from Oct. 10 to 14. Further information about these courses may be had from the hon. secretary of the council, Dr. J. B. McDougall, Preston Hall, near Maidstone, Kent.

Research Scholarship in Ophthalmology

A George Brewster and Jennie Mathews honorarium of $1000 is offered through the International Association for the Prevention of Blindness for original work in simple non-inflammatory glaucoma. Papers may be written in English, French, German or Italian; in order to facilitate the task of the jury, papers written in the last two languages should be accompanied by a translation in English or French. Further information may be had from the secretary of the association, 66 Boulevard Saint-Michel, Paris.

Hand-lamps for A.R.P.

The British Standards Institution has drawn up a specification for electric hand-lamps, fitted with a primary battery or unspillable accumulator, for general use during a black-out, either out-of-doors or in buildings in which the windows, roof lights and so on are not screened. The ordinary torch type of hand-lamp is not entirely suitable because no means are provided for preventing the light being directed upwards. The specification provides that the light emitted shall be properly directed and screened. Copies of the specification can be obtained from the institution at 28, Victoria Street, Westminster, S.W.1, price 3*d*.

The School-leaving Age

The Education Act, 1936, came into force on the 1st of this month. This raises the age for compulsory attendance at school from 14 to 15, and no child born after Sept. 1, 1925, will in future be allowed to leave school before the age of 15 unless he or she obtains an employment certificate from the local education authority.

Badge of Office

The Ministry of Health announces that full-time medical officers of the Emergency Medical Service will wear on their right arm a twill brassard bearing the letters "E.M.S." in deep red on a blue background.

International Congress for Life-saving and First-aid

The fifth international congress for life-saving and first-aid to the injured was held in Switzerland from July 23 to 28. Colonel Patry, vice-president of the international committee of the Red Cross, stressed the need for standardising first-aid equipment for use in major international catastrophes. Among the subjects discussed were first-aid work at sea and in town and in country, and in factories and in mines. Artificial respiration, the treatment of wounds and shock, and the training of the first-aid worker were also considered.

British Association

On Friday, Sept. 1, the remainder of the sessions of the association's meeting at Dundee were cancelled. Sir Richard Gregory, F.R.S., was elected president for the coming year.

Austrian Refugees

The Home Office has received from the Committee of Austrians in England a detailed list of the Austrians who have registered at the Austrian Centre, with an assurance that they will do all they can to help this country in wartime. The list includes 71 chemists, 108 female and 6 male nurses, and 41 doctors.

Local Medical and Panel Committee for London

The functions of this Committee, under the N.H.I. Acts and regulations, are now vested in a controller and an emergency committee of three. The chairman of the old committee automatically becomes the controller, while the committee of three are the former vice-chairman, the former treasurer and the former chairman of the finance and general purposes committee.

EMERGENCY NOTICES

The house and library of the Royal Society of Medicine will be closed for 14 days from the date of the outbreak of war. At the end of that time they will, if possible, reopen.

The staff and records of the Joint Council of the Order of St. John and the British Red Cross Society have been removed to Eastbourne, but the full staff of the ambulance department will remain at the headquarters, 12, Grosvenor Crescent, London, S.W.1.

The offices of the Chartered Society of Massage and Medical Gymnastics have been moved to Mount Lodge, Chesham Road, Amersham, Bucks. The society's annual congress, which was to have been held in London from September 18 to 22, has been cancelled.

The Clinical Research Association has moved to: Hilton's Annexe, South Road, Haywards Heath, Sussex. Tel. Haywards Heath 576. Labels with the new address will be forwarded on application.

The *Chemist and Druggist* will for the present be printed at Bath, and all correspondence to the editor should be sent to him there c/o The Pitman Press. The inquiry department will remain open at the London office, 28, Essex Street, W.C.2.

Until further notice the address of the Incorporated Society of Chiropodists will be Red Porch, Ashley Close, Walton-on-Thames, Surrey.

The offices of the Medical Research Council, which are at present largely occupied with emergency work, have been temporarily removed to the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, London, W.C.1 (Museum 3041).

The offices of the Medical Women's Federation have been moved to 73, Bourne Way, Hayes, Bromley, Kent (Tel. Hurstway 1904).

Medical Diary

UNIVERSITY OF GLASGOW

TUESDAY, Sept. 12—4.30 P.M. (Tennent Memorial Building, 38 Church Street), Dr. John Marshall: Problems of Blindness—Causes and Prevention.

Appointments

DUNSCOMBE, W. K., M.D. Durh., D.P.H., D.T.M. & H., medical officer of health for Shaftesbury, Sturminster, and Sherborne.

MATTHEWS, J. N., M.R.C.S., D.P.H., senior medical officer and assistant to the medical officer of health for Brighton.

TRUEMAN, R. S., M.B. Lond., F.R.C.S.E., resident surgical officer at St. James's Hospital, Leeds.

WALKER, A. J., M.B. Lond., resident medical officer at the Royal Bath Hospital, Harrogate.

London County Council.—The following appointments and promotions are announced. A.M.O. (I) or (II) = assistant medical officer (class I) or (class II):—

CLARKE, W. E., M.B. Lond., A.M.O. (I), St. Pancras;
FORSTER, DOROTHY D., M.B. Lond., deputy medical superintendent (class IV), Heatherwood;
GEDDIE, J. M., M.B. Aberd., A.M.O. (II), Hackney;
GREEN, R. D., M.D. Lond., M.R.C.P., Senior A.M.O. (II), St. Peter's;
HINDEN, ELCHON, M.B. Camb., M.R.C.P., A.M.O. (I), St. Leonard's;
MCGUINNESS, A. E., M.B. Sydney, A.M.O. (I), Fulham;
MACKINTOSH, F. G., M.B. Aberd., A.M.O. (II), Queen Mary's, Sidcup;
NORMAN JONES, DOROTHEA M., M.B. Camb., D.P.H., A.M.D. (II), Hackney;
STURGEON, A. W., M.D. Toronto, A.M.O. (II), St. Francis'.

Examining Surgeons under the Factories Act, 1937: Dr. S. CAMPBELL (St. Just district, Cornwall); Dr. I. F. W. EDWARDS (Kenninghall District, Norfolk).

Medical Referee under the Workmen's Compensation Act, 1925: Dr. P. H. O'DONOVAN for the County Court districts of Newark and Nottingham (Circuit No. 18).

Vacancies

*Albert Dock Hosp., Alnwick Road, E.*16.—Second Res. M.O., at rate of £110.
Birkenhead County Borough.—A.M.O., £600.
Bolton Co. Borough, Townleys Hosp.—Third asst. M.O., £350. Also 4th asst. M.O., £250.
*Bolingbroke Hospital, Wandsworth Common, S.W.*11.—R.S.O., £200. Also H.P. and Cas. O., each at rate of £120.
Brighton Royal Sussex County Hospital.—Third Hon. Radiologist.
Cambridge, Addenbrooke's Hosp.—Res. anæsthetist and emergency officer, at rate of £130.
Dorset County.—Assistant County M.O., £500.
*Dreadnought Hosp., Greenwich, S.E.*10.—H.P. and H.S., each at rate of £110.
Dunedin Hospital, New Zealand.—Radiotherapist, £1100.
East End Maternity Hosp., 396 *Commercial Road, E.*1.—R.M.O., at rate of £150.
Government of Eire, Army Medical Service.—Commissions.
Guildford, Royal Surrey County Hospital.—H.S., £150.
*London Hospital, E.*1.—First Asst. and Registrar to E. N. & T. Dept., £150. Also Surgical First Asst. and Registrar, £300.
Luton Borough.—Pathologist and Bacteriologist, £650.
Manchester Withington Hosp.—Asst. to Res. Obstet. Officer, at rate of £250. Also Res. Asst. M.O., at rate of £200.
*Metropolitan Hospital, Kingsland Road, E.*8.—Resident Appointments at rate of £100.
Plymouth, Prince of Wales's Hosp., Greenbank Road.—H.S., at rate of £120.
Plymouth, Prince of Wales's Hosp.—Sen. and Jun. H.S.'s for Devonport section, at rate of £130 and £120 respectively.
*Princess Louise Kensington Hosp. for Women, St. Quintin Avenue, N. Kensington, W.*10.—H.P. and H.S., each at rate of £120.
Preston County Borough, Sharoe Green Hosp.—Jun. Asst. R.M.O. at rate of £100.
Romford, Oldchurch County Hospital.—Asst. Res. Surgeon, £350.
Royal College of Surgeons of England.—Examiner.
Salvation Army Mothers' Hosp., Lower Clapton Road, E.5.—Jun. Res. M.O., at rate of £80.
South London Hosp. for Women and Children.—H.P., at rate of £100.
St. Marylebone Borough Council.—Public vaccinators, £90 and £30 approx. (according to district).
Staffordshire County Council.—Asst. county M.O., £800.
Tottenham Borough.—Temporary Asst. M.O.H. (A.R.P.), £550.
Union of South Africa, Dept. of Public Health.—Dietitian, £250.
Warrington Infirmary and Dispensary.—Third resident, at rate of £150.
Wickford (near), Essex, Runwell Hosp.—H.P., at rate of £150.
Willesden General Hosp.—Cas. O., at rate of £100.
The Chief Inspector of Factories announces a vacant appointment for Examining Surgeon at Thame, Oxon.

Births, Marriages and Deaths

BIRTHS

BELL-SMITH.—On Aug. 27, at Waltham Abbey, Essex, the wife of Dr. Donald Bell-Smith—a daughter.
DAVISON.—On Aug. 31, the wife of Dr. George Davison, of Cramlington—a daughter.
GRIFFIN.—On Sept. 2, at Uppingham, the wife of Dr. E. M. Griffin—a son.
JOYCE.—On Aug. 31, at Hong-Kong, the wife of Surgeon-Commander A. de B. Joyce, R.N.—a daughter.
ROBSON.—On Sept. 5, at Llandudno, the wife of Dr. J. R. Robson—a son.
SCOTT.—On Aug. 29, at Newcastle-on-Tyne, the wife of Capt. R. W. Scott, R.A.M.C.—a daughter.
TULLOH.—On Aug. 29, at Bournemouth, the wife of Dr. E. P. Tulloh—a daughter.
WALLEY.—On Aug. 27, at Chard, the wife of Dr. J. F. Loader Walley—a daughter.

MARRIAGES

ANDERSON—SHARP.—On Aug. 27, at Hendon, Anthony Francis Anderson, M.B., to Helen Margaret Sharp.
CHILD—BOND.—On Sept. 3, at Brighton, John Peto Child, B.M., to Margot Janet Laurie, only child of Sir Hubert Bond, K.B.E., F.R.C.P.
CRIMMIN—POOK.—On Aug. 26, at Soho Square, Capt. George William Crimmin, R.A.M.C., to Megan Pook.
CROSS—CORRY.—On Sept. 2, at Liss, Alexander Galbraith Cross, F.R.C.S., to Eileen Longman.
DANIELL—BENSUSAN-BUTT.—On Aug. 30, at Colchester, Peter Wilberforce Daniell, to Mary Barbara Bensusan-Butt, M.B., daughter of Dr. Ruth Bensusan-Butt, of Colchester.
MCILVENNA—LEWIS.—On Aug. 26, at Holy Cross, Edinburgh, Patrick William Fitzjames McIlvenna, L.R.C.P.E., of Edinburgh, to Margaret Lewis, of Hove, Sussex.
PHILIP—FLEW.—On Sept. 4, at Ealing, William Marshall Philip, M.B., to Yolande Flew.
PORTER—WYATT.—On Sept. 1, at Woodbridge, Hugh Lachlan Porter, M.B., to Barbara Mary Wyatt.
SHORE—PEARCE.—On Aug. 26, at Holy Trinity Church, Kingsway, Thomas Leonard Hall Shore, M.B., to Madeleine Elsie Pearce.
SUTCLIFFE—SHELDRAKE.—On Sept. 2, at the Brompton Oratory, Lieutenant William Greenwood Sutcliffe, R.A.M.C., son of Lieut.-Colonel D. G. Sutcliffe, O.B.E., F.R.C.S., of Margate, to Mary Charlotte Sheldrake, of Kelvedon, Essex.
SHUTTLEWORTH RENDALL—HORNSEY.—On Sept. 3, at Barnet, David Charles Shuttleworth Rendall, M.R.C.S., to Dorothy Hornsey.
TELLING—GORDON.—On Sept. 2, at Marylebone, Otto Maxwell Telling, B.M., to Dorothy Gordon.
WOOD—JOHNSTON.—On Aug. 26, at Enfield, William Wallace Wood, M.B., to Theodora Johnston, M.R.C.S.

DEATHS

BLACKSTONE.—On Sept. 3, at West Worthing, Sussex, Willoughby Arthur Blackstone, M.R.C.S.
MARLING.—On Sept. 3, Dorothy Barbara Marling, M.B. Lond.
MITCHELL.—On Sept. 1, at Old Hill, Staffs, Thomas Ellis Mitchell, M.B. Camb.
MILLER.—On Tuesday, Aug. 29, at Littlewick Place, near Maidenhead, Charles Hewitt Miller, C.B.E., M.D. Camb., F.R.C.P., of Portland Place, W., aged 64.
MILLER.—On Aug. 31, Richard Miller, M.R.C.S., D.T.M. & H., of Hove.
ORR.—On Aug. 28, at Bangor, Ulster, William Young Orr, M.B. Edin., D.P.H., late of Putney, S.W.
RUSSELL RYAN.—On Aug. 28, John Russell Ryan, M.D. Dubl., aged 77.
ROBERTS.—On Sept. 2, Charles Michael Roberts, M.B. Lond., of Woking, aged 59.
THOMSON.—On Aug. 30, at Etretat, France, Major Douglas Thomson, M.B. Dubl., D.P.H., R.A.M.C. (retd.), late Sudan Political Service.

CIBA LIMITED state that they have ample supplies of Percaine in its various forms ready for use, and, in addition, stocks of raw material from which percaine will shortly be manufactured in their new laboratories at Horsham.

" . . . It might be imagined that signs of hypernervousness when facing medical examiners, augur ill for an ability to withstand nervous strain. This is very far from being the case, and many examples can be given of excellent pilots who have been of a hypernervous type. In one instance a pilot, whose war record could only be described as first class, inevitably fainted when sitting in the dentist's chair. Many of the pilots who won Victoria Crosses in the war were of a quiet sensitive type, and some were distinctly hypernervous. . . . If a candidate, despite a fast pulse, a high pulse pressure, and other signs of 'nervousness,' can yet show a quiet demeanour, and an ability to think quickly, and answer readily, when he faces his medical examiner, it speaks well for his chances of making good."—Group-Captain A. F. ROOK, *J.R. nav. med. Serv.* July, 1939, p. 204.

NOTES, COMMENTS AND ABSTRACTS

IMMUNISATION AGAINST SCARLET FEVER IN FINLAND

THE Finnish army is unusually prone to streptococcal infections, manifest as sore-throat and scarlet fever. T. W. Wartiovaara is inclined to attribute this suceptibility to climatic conditions and to the sparse distribution of the community, which prevents young men from meeting streptococci till they are herded together in barracks (*Nord. Med.* June 3, 1939, p. 1671). Be this as it may, there have lately been 500–1000 cases of scarlet fever and 8–17 scarlatinal deaths every year in the army. Dick-testing on a large scale has shown only some 12–14·5 per cent. to be Dick-positive, but the scarlatinal morbidity among Dick-positive soldiers was 20·4 per cent. in 1933 and 14·4 per cent. in 1936, compared with 0·34 and 1·2 among the Dick-negative. Immunisation of the Dick-positive with toxin from an American strain, Dochez NY5, has yielded results encouraging as far as comparative freedom from scarlet fever is concerned, but rather discouraging as regards the reactions provoked. Sudden malaise, vomiting, giddiness and attacks of shivering have been noted, and although these may be ascribed in some cases to the toxin having been injected into the muscles by misadventure, Wartiovaara records the impression that there is room for improvement in the preparation and dosage of the antigen before inoculation is generally applied.

WHEN THE BOMB FALLS

THE doctor "on the spot" brings with him a fund of technical knowledge, a head perhaps cooler than most, and the tools of his trade. Without the last, the others are of little value. The doctor's immediate duty is to restrain the enthusiasm of the first-aid worker. His second is to relieve pain. To do this, he must have a hypodermic syringe, a solution of morphia and a bottle of chloroform. Today doctors should cling as tightly to these as to their gas-masks. Morphia and a syringe can find a place in the pocket, and even chloroform may be carried in a hip flask. In the big accident on the District railway at Charing Cross last September, H. J. B. Atkins,[1] who happened to be present, came away with the conclusion that morphia and chloroform were indispensable to the doctor on such occasions. Chloroform is rapid in its effects and relatively non-inflammable, and so is to be preferred to any other anæsthetic.

CATERING IN WAR-TIME

THE recipes and menus prepared by the staff of the Gloucestershire Training College of Domestic Science for the use of teachers learning to take classes in war-time dietaries have been collected into a little book (Communal Dietaries in War-time. University of London Press. 1939. Pp. 48. 1*s*.). The prescriptions have been tried out on and subjectively approved by the consumers in the college hall of residence, though young nettles, tender dock leaves, bracken and hop shoots, dandelion and sorrel may not be everyone's meat. Useful tables are included which help those who are faced with the problem of calculating tins of peaches, condensed milk and sardines in terms of protein and calories. Many of the recipes are unusual and interesting, including one for "faggots," and many sound unexpectedly appetising. They are intended for groups of people larger than the ordinary family, but will appeal to all who wish to base their housekeeping on sound modern dietetic principles.

LIGHTER SIDE OF THE CIVIL SERVICE

WITHOUT the usual background of public-school and university education Mr. R. W. Harris, obviously an inspired examinee, entered the Civil Service as a boy-clerk in 1890. He was first promoted to the India Office and later to "Taxes" where he served with such distinction that he was transferred to Somerset House as assistant to Lord Chalmers. This, however, did not mark the summit of his career, for in 1911 he was associated in the pioneer work of national health insurance administration with the great, but little known, W. J. Braithwaite. On retirement Harris became administrative secretary to the London School of Hygiene and Tropical Medicine, and at first sight these later activities might seem to be the only ones likely to interest medical readers. In fact this is far from being the case. His book (Not so Humdrum. London: John Lane. 1939. Pp. 271. 8*s*. 6*d*.) teems with good stories adroitly told, and the author has found fun where others, less observant, might have missed it. At least one reader, having chuckled his way through it, closed the book with regret and a heightened respect for the Civil Service.

A NEW USE FOR OLD X-RAY FILMS

MR. CLAUDE WHITE, M.P.S., writes:—Many of us are wondering how to protect windows from the blast of high-explosive bombs. The following scheme has many advantages. The cost is very small; it takes little time to carry out and, when completed, does not disfigure the windows; and it makes a tidy and attractive piece of work which can be undertaken at odd moments and then forgotten. The basic element in the scheme is the discarded X-ray film. This is stripped of the emulsion and the clean piece of celluloid is attached to the glass window by means of celluloid varnish. The celluloid sheet is thick and robust and will not buckle and kink like the thinner variety one often sees recommended for this purpose. Furthermore, it is non-inflammable. Some films have a blue base and these can be reserved for those windows where a slight light loss is of no importance.

The best way to clean the plates is to soak them in very hot water, after which the emulsion can easily be rubbed off. Pin them up to dry and store till needed under a weight to keep them flat. A suitable cement is made up of 5 parts of celluloid dissolved in 15 parts of acetone, to which is added 20 parts of copal varnish. Most hospitals will be glad to part with their discarded X-ray film for the asking. I am aware of quite a number of dispensaries where this method of window protection has been very successfully carried out.

SUBTROPICAL GARDENS

Dr. Jex-Blake has brought out a new edition, not this time of Gray's Anatomy but of "Gardening in East Africa,"[1] in which his exactitude and sense of proportion have served him well. It is indeed a practical handbook, for in its 26 chapters it deals in succession with climate, soil, growth factors, manuring, garden planning, horticulture, propagation, and the various kinds of plants to be cultured or propagated, and ends with chapters on garden pests, large and small. Curiously enough, only one chapter is devoted to the home flora, although its value is enhanced by the 10 coloured plates of indigenous trees, shrubs and plants which are a feature of this edition. It seems that the European in East Africa likes to be reminded of the plants with which he was once familiar, in the same way as the exile in the Swiss Alps tries to grow hollyhocks and strawberries in a landscape of gentians and alpenrose. As an offset to the vast amount of ordered information in the book is a riotous essay on "gardens at the coast" in which Mr. H. B. Sharpe makes the very shingle to blossom. So wide is its scope that the book may be of value to gardeners in almost any part of the globe.

1. Atkins, H. J. B., *Guy's Hosp. Gaz.* Oct. 8, 1938, p. 379.

1. A practical handbook by members of the Kenya horticultural society and of the Kenya, Uganda and Tanganyika civil services. (2nd ed.) Edited by A. J. Jex-Blake, D.M. Oxfd, F.R.C.P., with a foreword by Sir Arthur Hill, F.R.S. London: Longmans, Green and Co. 1939. Pp. 388. 12*s*. 6*d*.